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Macroeconomic Adjustment and Growth

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The Macroeconomics of Public Sector Deficits

The Case of Ghana

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and
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In developing countries, fiscal policy — in particular, the reduction of public sector deficits — has been a key element of stabilization and adjustment programs. An empirical analysis of fiscal deficits in Ghana, where they have been a prominent feature, reveals their significant effects on both the real and financial sides of the economy.

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This paper — a product of the Macroeconomic Adjustment and Growth Division, Country Economics Department — is part of a PRE research project on "The Macroeconomics of the Public Sector Deficit" (RPO 675-31). Copies are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Raquel Luz, room N11-057, extension 34303 (170 pages, with figures and tables).

Ghana's economic program after independence emphasized public investment and spending as the road to growth, a strategy that led to recurring fiscal deficits and declining growth. By 1983, per capita income was 10 percent lower than in 1957. Since the 1984 Economic Recovery Program, Ghana's fiscal deficits have declined and the public sector has been rationalized. Average growth rates have become positive.

Islam and Wetzel provide two different definitions of the fiscal deficit in Ghana. The first, more conventional approach aggregates the components of the public sector, including the central government, the social security and national insurance trust, state-owned enterprises, and the cocoa marketing board. However, because of the lack of data, this method of treating the deficit may understate its true value.

The second way looks at the total financing flows to the public sector. Data on the central government debt are supplemented with data on the claims of the central bank and banking system against state-owned enterprises and data on public external debt.

Islam and Wetzel examine the ways Ghana chose to finance its deficits and how these affected the financial side of the economy. They find that before implementation of the adjustment program of 1983, the government relied mainly on money creation for financing, though this was more by default than by choice since external lending was unavailable until 1984. This policy led to high inflation, negative real interest rates, an overvalued currency, and the emergence of black markets. These forces further eroded the tax base and ultimately increased the deficit.

The authors also find that high levels of inflation, combined with government restrictions on private currency holdings, affect the demand for assets in Ghana, leading to a Laffer curve effect in government seigniorage: After a certain point, an increase in the inflation rate actually causes a reduction in seigniorage revenue. Yet given the government's dependence on monetary finance, reduced seigniorage meant more money creation and higher inflation.

According to Islam and Wetzel:

- The fiscal deficit has had only little effect on private consumption; lagged consumption and disposable income were more important.

- Public sector investment in Ghana has mostly substituted for private investment. The current program of divestiture of state-owned enterprises should lead to an increase in private investment.

- The fiscal deficit had a significant negative effect on the external side. The official real exchange rate tended to appreciate, the trade balance worsened, and the black market premium rose.

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I. INTRODUCTION

A pervas e macroeconomic phenomenon in both industrial and developing countries has been the growth and persistence of fiscal deficits. The issues surrounding fiscal deficits are certainly not new, but the economic developments of the past decade have led to renewed interest in fiscal themes. In the developed countries, the growth of the U.S. federal deficit provided the impetus for a reassessment of the effect of fiscal deficits on economic activities. In the developing countries, fiscal policy, particularly the reduction of fiscal deficits, has been one of the cornerstones of short-term stabilization and medium-term adjustment programs.

The macroeconomic theory concerning fiscal deficits has undergone a considerable transformation since Keynes emphasized fiscal policy in his General Theory. Rational expectations and the proposition of Ricardian equivalence put the effectiveness of traditional demand management policies into question. Much of the discussion over fiscal policy in the past fifteen years has addressed the question of whether fiscal deficits and the way in which they are financed will have an effect on economic activity.

While the theoretical debate continues, in practice fiscal deficits continue to be an important issue. In developing countries in particular, economic programmes in recent years have emphasized demand reduction via reductions in fiscal deficits. The underlying assumption is that fiscal

deficits will have an effect on demand. The idea that fiscal deficits are something that can be measured and managed is implicit in that assumption, yet as experience in both developed and developing countries shows, deficits may not be so easy to measure nor to control.

This study presents an empirical investigation of fiscal deficits in Ghana and assesses their effect on the financial and real side of the economy. The case of Ghana is interesting because of the major role that fiscal deficits have played in her economic history. At the moment of independence Ghana was perceived to be at the forefront of the African countries. Her population was well educated and economic infrastructure was strong. Under Nkrumah, the first government led a statist economy that emphasized public investment and public spending as the road to economic growth. As time went on, governments became more and more profligate and deficits increased. Over the same time period, economic conditions degenerated. In 1983, the nadir was reached -- per capita income was over ten percent lower than its 1957 level.[1]

In 1984, the government initiated the Economic Recovery Programme (ERP) in an attempt to rescue Ghana's economy. An important component of this programme has been the reduction of fiscal deficits and the "rationalization" of the public

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[1] For an interesting review of Ghana's economy since independence see Rimmer (1989).

sector.[2] The ERP is still in place and fiscal deficits have been reduced relative to their levels in the 1970s. Average annual growth of real GDP has averaged 6 percent in the post-1983 period as compared to -3.4 percent in the period from 1978 to 1983.

Given the multitude of factors at work in the Ghanaian economy, it is difficult to attribute the decline and renewal of the economy to any one factor. We will instead try to evaluate the impact that fiscal deficits may have had on certain macroeconomic variables which may in turn have affected Ghana's economic performance.

The study is set out in three sections. In the first section, we consider various measures of the fiscal deficit in Ghana. An ideal measure would include all components of the public sector including central, state and local government, decentralized agencies, state-owned enterprises and even the central bank. Although the data for all these levels of the public sector are not available, we construct a measure of the consolidated fiscal deficit from the available information. We then construct an alternative measure of the fiscal deficit based on the flow of funds to the public sector.

In the second part, we focus on fiscal deficits and financial markets. We first consider how the way Ghanaian deficits have been financed may influence certain

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[2] Other components of the programme are devaluation of the exchange rate, liberalization of the trade regime and , more recently, financial reform.

macroeconomic variables, particularly inflation. We then assess how inflation affects demand for money and quasi-money. A simple model is constructed that allows us to assess the relationship between fiscal deficits, inflation, and seignorage.

The third part of the study addresses the effect of fiscal deficits on private consumption (NB: private investment is discussed in the companion paper by Ms. Islam). The relevance of the various theories concerning the effect of fiscal deficits on private sector demand is considered by estimating a consumption function.

The relationship between fiscal deficits and the external sector (the real exchange rate and the trade balance) is also considered in the companion paper.

The empirical nature of the study calls for a caveat. Generally, the data for developing countries is not always as complete and as consistent as develcped country data. Data difficulties and limitations are particularly acute in African countries and Ghana is no exception. In general, the most reliable data sources available were used, but there is no guarantee that the measurement of any given variable was consistent over time. Given the severe lags in accounting and general instability in the Ghanaian economy during the period that we cover (1970-1988), it is quite likely that there is a fair amount of "noise" in the data used, which may affect our regression results. In addition, because of data limitations,

we tend to use fairly simple equations for estimation. While these equations may not represent the frontier of econometric modelling, they do let us glean some information about the basic relationships between fiscal deficits and other macroeconomic variables.

The principal conclusions of our analysis are as follows:

1.) Because of the lack of data, the conventional approach to treating the deficit may present a misleading picture in Ghana. Determining the deficit using financing flows to the public sector provides an alternative measure of the claims that the public sector makes on resources that differs considerably from the conventional measure. Using either measure, Ghana has had significant public sector deficits over the past two decades.

2.) Lack of access to external lending and weak domestic financial markets imply that the bulk of the public sector deficit was financed by money creation. Access to external lending allowed the government to substitute foreign financing for money creation after 1984, but money creation did not fall as much as one would expect. In the mid-late seventies, the correlation between money creation and inflation was high, suggesting that fiscal deficits contributed to the high levels of inflation at the time. This relationship is less clear cut in the eighties, but this is not surprising given some

substantial supply shocks during the period.

3.) Inflation has a significant, negative influence on the demand for money and the demand for deposits. The domestic interest rate was not found to have any significant effect on either the demand for money or the demand for deposits. One possible explanation of these results is the highly regulated nature of Ghana's financial markets until recently.

4.) A simple model set out in section II indicates that high rates of inflation provided the Ghanaian government with seignorage revenue only 1 to 2 percent of GDP greater than it would have received with an inflation rate of 20 percent. Since 1984, the level of seignorage has not differed greatly from the level that would have existed at a 20 percent rate of inflation. The model also suggests that had the government not appropriated private currency in the currency conversion of 1979, seignorage revenue would have been higher throughout the period.

5.) Lagged consumption and disposable income were found to be the principal determinants of private consumption. The results of this estimation indicate that neither pure Ricardian equivalence nor the pure Keynesian theory hold. The significance of disposable income indicates that liquidity constraints affect consumption decisions. Numerous fiscal

variables were tested as set out in the research proposal, but none were found to be significant.

6.) Private investment was found to be negatively affected by public investment, thus indicating that some crowding-out did occur in Ghana. Private investment is also positively influenced by a relaxation of credit constraints and by corporate tax revenues. (This suggests that corporate tax revenues might be highly correlated with corporate profits.) The real interest rate was not found to have a significant influence on private investment.

7.) Public expenditure has had a significant impact on the official real exchange rate, the trade balance, and on the black market premium. Increased public expenditure was found to have a negative effect on the trade balance. It was also found to have a negative effect on the official exchange rate (higher public expenditures tended to appreciate the real exchange rate). The empirical results also show that a rising public sector deficit along with stringent restrictions on foreign exchange transactions lead to a very high black market premium.

II. MEASURING THE DEFICIT

Implicit in the notion of targeting the fiscal surplus or deficit[3] is the idea that one is able to obtain a reasonable measure of the deficit. This is not necessarily as straightforward as it might seem. Keynesian theory initially viewed the deficit as exogenous. It soon became clear that the deficit was actually endogenous, given that tax revenues and government expenditures are partly determined by the level of economic activity. Various measures of the deficit have been developed to adjust for cyclical movements in the economy and to incorporate the effects of certain macroeconomic variables (particularly inflation). As is normally the case, the most appropriate measure of the deficit depends upon the purpose of the analysis.

Tanzi and Blejer (1984) discuss what they call the "conventional deficit" with reference to the definition set out in the International Monetary Fund's "Draft Manual on Government Finance Statistics". This measure arranges the payments and receipts of the government sector accounts as follows:

Fiscal Deficit = (Revenue + Grants) - (Expenditure on Goods

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[3] For the rest of the discussion we will refer only to deficits as they are generally the more common phenomenon.

and Services + Transfer Payments + Net Lending),

or alternatively,

Fiscal Deficit = Borrowing + Net Decrease in Cash Holdings - Amortization

This approach does have its shortcomings. First, the definition emphasizes cash flow concepts rather than accrual concepts of accounting. At times, the cash flow concept may not fully reflect underlying trends. For instance, if a government purchases goods and services and delays payment (builds up arrears), the cash concept may not reveal in the current year that the level of spending has changed. Tanzi and Blejer point out that while capturing the monetary impact of the budget, the cash concept may not capture the income-creating (i.e., the Keynesian) impact. They note that in the heyday of Keynesian economics (the mid-sixties), the accrual concept was generally preferred to the cash concept.

The classification of grants as a revenue source rather than as a financing item is also a practice that is questionable. Grants are not usually permanent sources of income and therefore may fluctuate. (In Ghana they have fluctuated dramatically over the years.) Unless grants are a guaranteed source of revenue, it might be advisable to

classify them as a financing item.

Similar questions may be raised as to whether net lending should be included as part of the public sector's deficit. If the net lending is extended to the private sector then it does not necessarily reflect public sector use of resources, but rather, it reflects the public sector's role as a financial intermediary. If the net lending is extended to the public sector (say from the central government to a state-owned enterprise) then it does imply a public sector claim on resources, in which case net lending probably should be included on the expenditure side. In practice, in many developing countries at least, lending between the various levels of the public sector is often not repaid and thus effectively becomes a net transfer.

Tanzi and Blejer note a final issue concerning this measure of the deficit. When inflation is significant it may be difficult to distinguish in an economic sense between amortization payments and interest payments. As all interest payments are considered as an expenditure item and no allowance is made for the repayment element implicitly included in the interest payment, the size of the deficit may be overstated.

The World Bank's "World Development Report 1988" discusses different measures of the deficit.[4] It first cites the public sector borrowing requirement (PSBR) as a useful

[4] See World Bank (1988), p.56.

indicator of the public sector's net use of financial resources. The PSBR represents the total excess of expenditure over revenue for all government entities, all of which must be financed by new borrowing net of repayment of previous debt. This measure is also referred to as the "consolidated public sector deficit". In the calculation of the PSBR expenditure includes wages of public employees, spending on goods and fixed capital formation, interest on debt, transfers and subsidies. Expenditure does not include amortization payments on government debt or accumulation of financial assets (net lending). Revenue includes taxes, user charges, interest on public assets, transfers, operating surpluses of public companies, and sales of public assets. Revenue does not include the drawdown of cash reserves.

A measure that is often used is the "primary deficit". This subtracts all interest payments from the PSBR in order to obtain a measure of the current policy stance. The argument is that the interest payments currently being made reflect past policy decisions rather than present policy. In order to evaluate current policy, these payments should not be included in the deficit measure. Another concept of the deficit excludes only the inflationary component of interest payments.

Finally, the Report discusses the "structural deficit". This measure presents the deficit adjusted for up- and down-turns in the business and/or commodity cycle and for factors

that might cause temporary deviations from the trend level of expenditure and tax revenue. Such temporary deviations might be caused by any temporary expenditure or tax policy such as a tax amnesty or a decision to withhold government sector wages. While in theory the structural deficit is clear cut in practice it is often difficult to calculate, particularly in developing countries.

Recent research[5] has emphasized the importance of obtaining a complete picture of the public sector claim on resources by including all levels of the public sector. Thus the consolidated public sector deficit should include data not only on the central government accounts, but on regional and local accounts as well as on decentralized public agencies and state-owned enterprises.

The measures of the deficit discussed to this point have largely been pragmatic ones in that they provide measures that are for the most part practicable given the average level of data availability. Both Boskin (1982) and Buiter (1983) note that these measures, and the way they are calculated, may be quite far from the analytical concepts that are used in the theoretical debate over the effects of the fiscal deficit.[6]

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[5] See Easterly (1989a, 1989b), Marshall and Schmidt-Hebbel (1989) and World Bank (1988).

[6] Boskin (1982) also makes the important point that, given the difficulties inherent in obtaining a measure of the deficit, econometric analyses of the impact of the deficit may be based on analytically inappropriate concepts or on substantial measurement error and that the issues at hand are not being analyzed or tested in an appropriate manner.

Buiter (1983) goes into some detail in presenting a set of stylized accounts that corresponds to an estimate of the comprehensive net wealth or permanent income accounts for the public sector. From these accounts he derives the government budget constraint. He essentially extends the permanent income hypothesis to the public sector.[7] Buiter argues that in a first best world not only private agents, but governments and international organizations as well, would decide on spending, saving, lending, production and portfolio allocation constrained only by comprehensive wealth or permanent income. Buiter goes on to argue that both the conventional analysis of the public sector balance sheet[8], and the comprehensive wealth accounts that he outlines, should be incorporated into an analysis of the public sector. The conventional accounts provide a guide to the binding constraints on public sector behavior in any given period. The comprehensive accounts provide an indication of the real net worth of the public sector over time and hence optimal policy when the only constraint is permanent income. We have not attempted to construct these comprehensive wealth accounts for Ghana.

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[7] The permanent income hypothesis set out by Friedman in 1957 argues that current consumption decisions are determined by expected lifetime income (as opposed to only current income). The theory in its simplest form is represented by the optimization of intertemporal consumption subject to lifetime wealth. While the theory ordinarily discusses private consumption, Buiter extends it to public sector decisions as well.

[8] These typically contain only marketable financial assets and liabilities.

We first consider in detail the data that are available for Ghana and construct a measure of the consolidated public sector deficit from the income and expenditure accounts of the government. The definition of the deficit used follows that of Tanzi and Blejer (1984). We then consider the effects that economic and policy variables have had on the conventional deficit based on the framework set out in Marshall and Schmidt-Hebbel (1989). Because the conventional measure of the deficit underestimates the true public sector deficit, we then construct a measure of the public sector deficit from the financing side using information that is available on the total stock of domestic and external public sector debt which provides an alternative assessment of public sector claims on resources.

1.) The conventional approach to the public sector deficit

Discussions of the fiscal deficit in the literature on Ghana generally focus on the accounts of the central government with reference made to the importance of other parts of the public sector (e.g. state-owned enterprises).[9] Reports of the international organizations include more detailed information on components of the public sector such as the Social Security and National Insurance Trust and the Cocoa Marketing Board, but no attempt at consolidation is

[9] See Green (1987), Huq (1989), Killick (1978), and Rimmer (forthcoming).

made. There are a number of reasons why a consolidation of the public sector has not been undertaken. One reason is that data on the state-owned enterprises, which constitute a sizable portion of the industrial sector, are not available until 1984, and even then they are not complete. Another difficulty is that some of the accounts of public sector institutions are kept on a fiscal year basis while others are kept on a calendar year basis.

a) The consolidated public sector deficit

With these difficulties kept in mind one can at least gain an idea of the order of magnitude of the fiscal deficit by taking into consideration the data that are available. Figure 2.1 shows the public sector revenue, expenditure, and deficit (as a percent of GDP) that consolidates all the available information including data on the central government accounts[10], the Social Security and National Insurance Trust accounts, and data on the net profits or losses of the Cocoa Marketing Board (through 1988) and the Ghana Industrial Holding Corp (through 1986)[11]. Very little data is available

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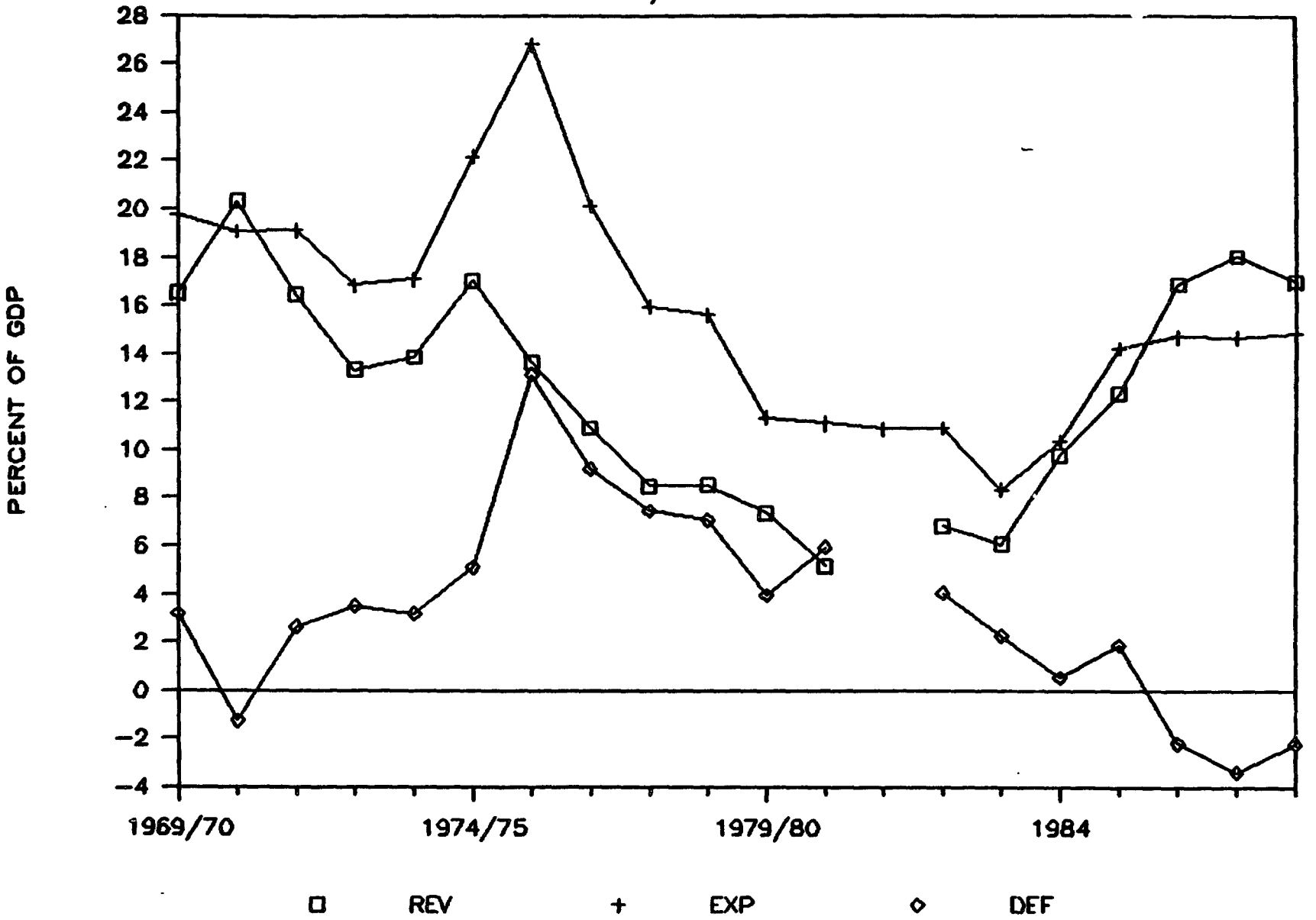
[10] Note that the data presented on the central government exclude capital expenditure financed through external project aid and the corresponding grants and loans. To the extent that these loans are disbursed, the figures presented may underestimate capital expenditure and thus may give a figure for total public sector expenditure that is underestimated. The exclusion of this information becomes problematic in the years after 1984, when project aid into Ghana increased dramatically.

[11] The consolidation added up the central government accounts and the social security accounts. The net operating surpluses (deficits) of the Cocoa Marketing Board and the Ghana Industrial Holding Corp. were added (subtracted) to (from) the revenue side.

FIGURE 2.1

PUBLIC SECTOR: REV., EXP. & DEF.

1969/70 – 1988



on local government revenues and expenditure in Ghana. In general, the government has traditionally been very centralized and the central government has provided over half of the revenue of the local governments in the form of budgetary transfers. The absence of data on local government finance therefore does not pose major problems for our measure of the fiscal deficit. In contrast, the absence of data on the state-owned enterprises other than the Ghana Industrial Holding Corp. does imply that we are missing an important part of the claim on public sector resources. The effect of this absence will be discussed below.

Considering Figure 2.1 which is based on a consolidation of the above-mentioned accounts, we see that for the majority of the past two decades public sector expenditure has surpassed revenue and that public sector deficits have been significant. Consolidated public sector expenditure was approximately 19 percent of GDP in the 1969/70 fiscal year and peaked at 26 percent of GDP in 1975/76. It dropped sharply after 1975/76, reaching a minimum of roughly 8 percent of GDP in 1983. Since 1983 consolidated public sector expenditure has risen and has reached a plateau at about 14 percent of GDP.

While an attempt was made to take intergovernmental transfers into account, the breakdown of information did not allow for the complete removal of all double counting. Prior to 1984, data on a fiscal year basis and that on a calendar year basis were consolidated by classifying calendar data under the fiscal period ending with the given year. For example, 1975 yearly data are classified with 1974/75 fiscal year data. It was not possible to reclassify fiscal year data into calendar year data.

Consolidated public sector revenue peaked in 1970/71 as a result of a sharp increase in revenue from import and export taxes on cocoa. Consolidated public sector revenue declined from this point onward reaching a trough in 1980/81 of about 5 percent of GDP. After 1983, revenue collection improved sharply rising to 18 percent of GDP in 1987 and then dropping slightly to 17 percent of GDP in 1988.

Based on this data, the public sector deficit (expenditure minus revenue) moved from a surplus of a little bit more than one percent of GDP in 1970/71 to a deficit of 13 percent of GDP in 1975/76. The deficit dropped to about 4 percent of GDP in 1979/80 but then increased sharply in 1980/81 due to a sharp drop in public sector revenue. After 1982, the deficit declined and moved into a surplus of approximately 2 percent of GDP and has remained at about that level. Due to the lack of data on the state-owned enterprises and due to the fact that all capital expenditure financed by tied external loans or grants is excluded, we are fairly safe in assuming that the deficit that results from the consolidation of these accounts is not giving a complete picture of the resources that are being claimed by the public sector. Before going on to alternative approaches, let us consider briefly the components of the consolidated deficit that we have just described.

i) The central government

Given the absence of detailed accounts on the state-owned

enterprises,the pattern shown by the consolidated public sector is dominated by the revenue and expenditure of the central government. Central government expenditure as a share of GDP is only slightly less than that for consolidated public sector expenditure as seen in Figure 2.2. This is explained by the fact that data on the Cocoa Marketing Board and on the Ghana Industrial Holding Corp. are in the form of net profits or losses. They were thus included in the consolidation on the revenue side. The difference between consolidated public sector expenditure and central government expenditure reflects the expenditure of the Social Security and National Insurance Trust.

A breakdown of central government expenditure over the period from 1969/70 to 1988 is presented in Table 2.1. The most striking point brought out by the expenditure breakdown is the dominance of central government expenditure on consumption over expenditure on investment. Throughout the period central government consumption remained steady wnile investment by the central government varied considerably in line with general economic conditions. Neither interest payments nor current transfers take a large part of central government expenditure, although interest rates have increased in the 1980s. Net lending is low throughout the period.

As seen in Figure 2.2, central government revenue as a share of GDP has varied considerably over the past two decades. It peaked in 1970/71 at almost 20 percent of GDP,

FIGURE 2.2

CENTRAL GOV., REV., EXP. & DEF.

1969/70 – 1988

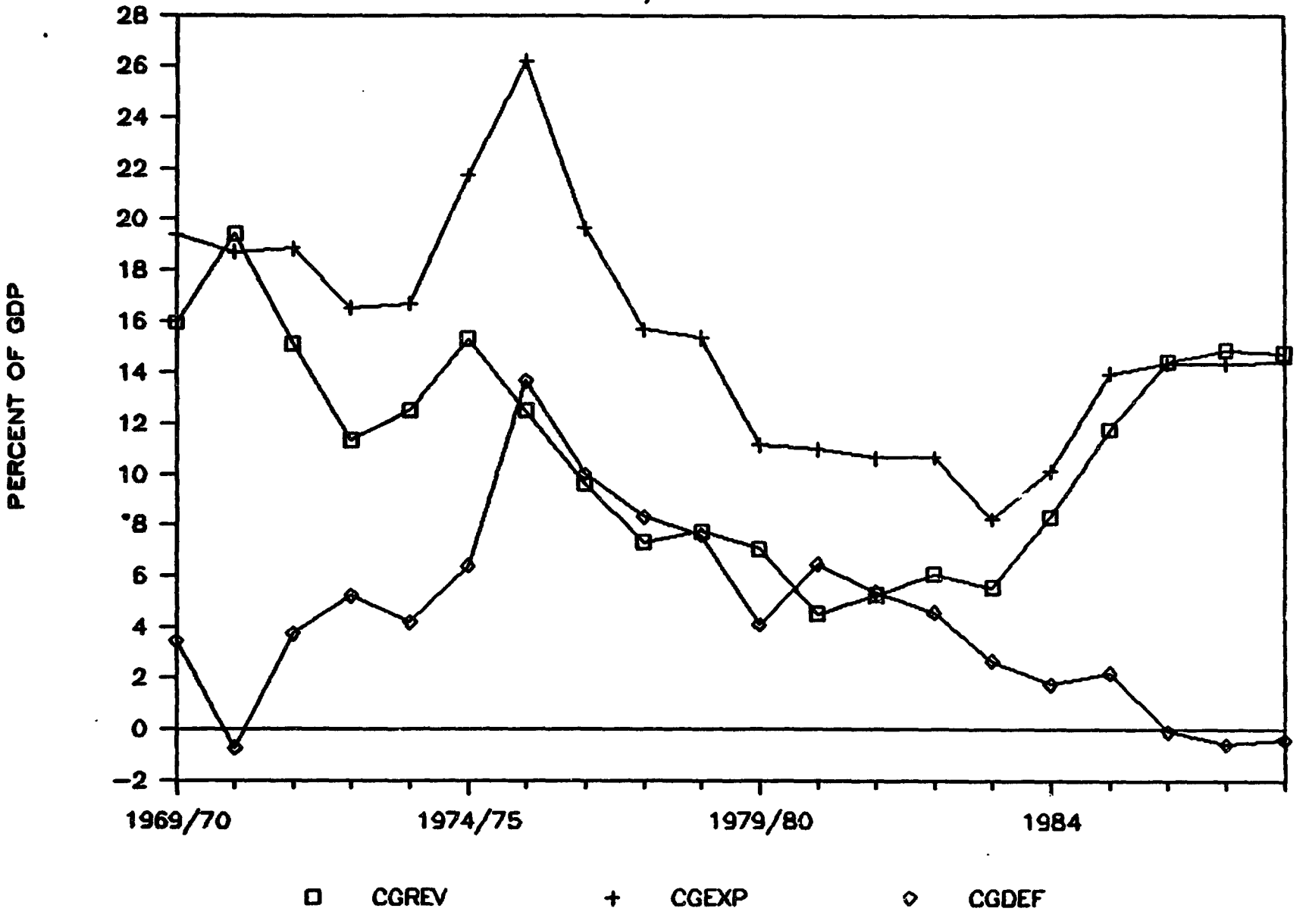


TABLE 2.1

GHANA: ECONOMIC CLASSIFICATION OF CENTRAL GOVERNMENT EXPENDITURE (AS A PERCENT OF TOTAL EXPENDITURE AND NET LENDING)

	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982	1983	1984	1985	1986	1987	1988
I. TOTAL CURRENT EXPENDITURE	81.37	77.14	71.82	75.62	76.89	73.80	58.27	59.59	70.51	76.81	85.17	79.25	86.01	87.08	89.38	84.87	80.31	82.96	75.32	74.06
CONSUMPTION	41.64	52.83	51.49	51.76	56.40	52.90	44.83	39.09	45.46	45.92	45.00	45.15	44.32	47.11	47.87	56.92	57.36	57.47	56.67	56.67
WAGES AND SALARIES	22.44	31.70	31.77	33.89	29.32	31.72	24.84	20.64	24.99	28.14	26.03	28.40	24.96	24.94	24.66	19.22	30.33	35.72	33.57	33.00
OTHER GOODS AND SERVICES	19.20	21.13	19.71	17.87	25.08	21.18	19.99	18.45	20.47	17.78	18.97	16.75	19.36	22.17	23.20	37.70	27.04	21.75	22.90	23.67
INTEREST	9.35	8.67	10.84	9.62	8.94	6.43	5.84	8.06	7.35	11.84	15.15	12.80	21.44	23.52	14.52	12.46	10.62	15.47	9.90	7.98
DOMESTIC	6.77	6.47	7.45	8.78	7.90	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.96
EXTERNAL	2.58	2.20	3.39	0.85	1.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.02
CURRENT TRANSFERS	30.38	15.65	10.38	14.39	13.47	14.46	11.05	14.85	18.98	18.61	25.09	20.88	19.83	24.82	26.99	15.49	12.33	10.02	8.95	9.41
DOMESTIC SECTORS	30.24	15.26	10.16	13.85	13.12	14.16	10.75	14.44	18.83	18.36	24.55	20.63	19.58	24.58	NA	NA	NA	NA	NA	NA
OF WHICH TO OTHER LEVELS OF GOVT	25.72	10.20	NA	NA	NA	NA	NA	NA	14.45	2.40	3.48	2.74	3.02	2.57	3.10	1.90	0.53	8.96	8.13	7.82
ABROAD	0.14	0.38	0.23	0.45	0.35	0.30	0.29	0.41	0.15	0.25	0.54	0.25	0.25	0.24	NA	NA	NA	NA	NA	NA
OTHER/STATISTICAL DISCREPANCY	0.00	0.00	-0.88	0.14	0.08	0.00	-3.45	-2.41	-1.28	0.44	-0.06	0.43	0.42	-8.36	0.00	0.00	0.00	0.00	0.00	0.00
II. TOTAL CAPITAL EXPENDITURE	18.75	22.33	18.13	14.54	16.41	20.56	25.77	29.02	21.11	17.50	12.43	17.40	10.07	8.86	7.85	12.25	15.25	13.40	17.36	19.94
GROSS FIXED CAPITAL FORMATION	12.86	19.15	17.08	14.21	14.56	18.65	20.36	24.15	16.20	15.85	10.94	11.83	8.56	7.37	6.58	10.59	13.41	11.13	14.54	17.93
CAPITAL TRANSFERS	5.88	3.18	1.05	0.33	1.85	1.91	1.99	2.44	2.74	1.65	1.48	2.40	1.13	1.10	0.87	1.39	1.51	2.21	2.69	1.83
OF WHICH TO OTHER LEVELS OF GOVT.	5.88	3.14	1.02	0.33	1.85	NA	NA	NA	NA	NA	NA	0.15	0.05	0.05	0.06	0.09	0.00	0.00	0.00	0.00
OTHER CAPITAL PAYMENTS	0.00	0.00	0.00	0.00	0.00	0.00	3.45	2.43	2.16	0.00	0.01	3.18	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
III. NET LENDING	2.83	3.03	10.05	9.64	6.71	5.64	15.96	11.39	8.38	5.69	2.40	3.34	3.92	4.06	2.77	2.88	4.44	3.64	6.54	3.99
IV. OTHER	-2.94	-2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.80	2.01
TOTAL EXPENDITURE (I+II+III+IV)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

SOURCE: WORLD BANK DATA

dropped sharply over the next two years and had a second, but lower peak in 1974/75 at 15 percent of GDP. Central government revenue then declined sharply over the next six years reaching a low of 4.52 percent of GDP in the 1980/81 fiscal year. Revenues increased slightly over the next few years and in the period between 1983 and 1986 they increased sharply and have since leveled-off at about 15 percent of GDP.

The decomposition of central government revenue (see Table 2.2) shows that Ghana, like many other African countries, receives the greatest part of its revenue from taxes on international transactions and from import and export duties in particular. As other studies on Ghana have noted[12], the taxation of cocoa exports has been particularly heavy. The percentage of total revenue and grants from indirect taxes averaged 66 percent over the period. Import duties provided an average of 16 percent of total revenue over the period and export duties contributed an average of 22 percent. Other indirect taxes on domestic goods and services averaged 27 percent of total revenue over the period. In contrast, the percentage of total revenue and grants from direct taxes such as those on income, corporate taxes, and payroll taxes (not including contributions to social security) averaged 21 percent over the period from the 1969/70 fiscal year to 1988.

The dependence on export taxes as the primary source of

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[12] See Rimmer (1989).

TABLE 2.2
GHANA: CENTRAL GOVERNMENT REVENUE (AS A PERCENT OF TOTAL REVENUE)

	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982	1983	1984	1985	1986	1987	1988
I. TAX REVENUE	92.34	90.95	86.87	89.31	85.88	89.75	86.91	91.07	90.84	91.28	93.27	90.55	92.07	84.54	82.59	79.19	80.67	84.49	85.46	84.02
A. DIRECT TAXES	19.15	13.04	17.94	22.40	19.83	20.36	24.91	21.74	19.76	17.49	20.16	26.04	29.43	28.60	17.97	18.23	19.16	19.18	21.69	26.34
TAXES ON INCOME, PROFITS:	19.12	13.02	17.91	22.38	19.49	19.75	24.29	21.00	19.37	17.40	19.93	13.60	19.91	18.49	12.20	13.88	13.80	13.69	16.17	21.28
INDIVIDUAL	8.16	5.78	8.39	10.08	8.42	8.49	10.23	9.65	11.12	9.68	10.16	1.89	6.31	5.85	3.40	3.27	2.97	2.42	3.22	3.30
CORPORATE	10.96	7.24	9.52	12.30	11.07	11.26	14.07	11.35	8.25	7.72	9.77	11.71	13.60	12.64	8.81	10.61	10.84	11.27	12.95	17.98
PAYROLL	0.00	0.00	0.00	0.00	0.34	0.37	0.37	0.19	0.13	0.09	0.07	9.82	8.51	8.40	5.04	4.02	4.62	4.70	4.10	3.91
TAXES ON PROPERTY	0.03	0.02	0.02	0.03	0.00	0.23	0.24	0.56	0.26	0.00	0.17	2.62	1.01	1.71	0.73	0.33	0.73	0.79	1.42	1.15
PROPERTY TAXES	0.03	0.02	0.02	0.03	0.00	0.00	0.00	0.37	0.13	0.00	0.00	0.12	0.22	0.17	0.12	0.04	0.06	0.08	0.06	0.00
OTHERS	0.00	0.00	0.00	0.00	0.00	0.23	0.24	0.19	0.13	0.00	0.17	2.50	0.79	1.54	0.62	0.30	0.67	0.72	1.36	1.15
B. INDIRECT TAXES	71.55	76.60	68.32	66.43	65.72	68.97	62.01	69.32	71.08	73.78	73.10	64.51	62.64	55.94	64.62	60.97	61.51	65.31	63.77	57.68
TAXES ON DOMESTIC GOODS AND SERVICES	26.73	22.78	27.62	27.62	16.23	16.42	29.10	32.13	26.18	19.00	27.26	42.99	42.04	40.90	15.90	24.56	22.26	26.65	23.56	25.15
GENERAL SALES, TURNOVER, VAT	10.30	8.00	9.59	10.13	5.88	5.71	6.47	6.08	4.69	3.93	3.50	5.46	4.31	5.33	2.32	1.95	2.92	4.31	7.53	8.03
EXCISES ON GOODS	16.21	14.31	17.44	17.19	10.13	10.49	22.39	25.68	21.04	15.07	23.76	31.62	33.43	28.62	13.58	22.62	19.34	22.34	16.03	17.13
OF/AMON PETROLEUM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00	0.00	0.00	1.49	8.96	4.50	7.45
EXCISES ON SERVICES	0.22	0.47	0.59	0.30	0.22	0.22	0.24	0.37	0.45	0.00	0.00	5.92	4.31	6.95	NA	NA	NA	NA	NA	NA
TAXES ON INTERNATIONAL TRADE AND TRANSACTIONS	44.82	53.81	40.70	38.81	49.49	52.55	32.91	37.20	44.90	54.78	45.84	21.52	20.59	15.04	48.72	36.40	39.25	38.66	40.20	32.53
IMPORT DUTIES	13.13	17.17	14.02	15.22	19.03	17.21	9.96	11.47	25.66	16.26	14.75	14.12	16.92	10.87	19.25	13.95	16.35	19.34	16.01	16.62
CUSTOMS DUTIES	11.80	12.28	10.62	14.74	15.20	13.21	5.63	6.89	25.07	16.21	11.91	13.51	14.68	9.41	14.46	10.50	11.49	13.40	10.95	9.31
OTHER IMPORT CHARGES	1.33	4.89	3.40	0.48	3.82	4.00	4.33	4.59	0.59	0.05	2.84	0.61	2.24	1.47	4.79	3.45	4.86	5.93	5.07	7.31
EXPORT DUTIES	31.70	36.64	25.89	23.31	30.27	35.34	22.95	25.73	18.57	38.52	30.56	0.05	0.13	0.04	28.64	21.97	22.75	19.33	24.19	15.91
COCOA	31.50	36.50	25.70	23.06	28.66	34.51	21.99	25.03	18.06	38.14	30.36	0.00	0.00	0.00	27.34	19.91	21.98	18.95	24.17	15.91
OTHER	0.19	0.14	0.19	0.25	1.61	0.84	0.95	0.70	0.51	0.38	0.20	0.05	0.13	0.04	1.31	2.05	0.77	0.38	0.02	0.00
OTHER TAXES ON INT'L. TRANSFERS	0.00	0.00	0.80	0.28	0.19	0.00	0.00	0.00	0.68	0.00	0.53	7.35	3.54	4.13	0.82	0.48	0.15	0.00	0.00	0.00
MISC. TAXES	0.64	1.32	0.61	0.48	0.33	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
II. NONTAX REVENUE	7.58	8.37	13.13	10.64	13.32	10.24	13.09	8.93	9.09	8.72	6.73	8.08	6.79	14.47	16.85	16.77	15.31	10.25	9.11	8.46
SALE OF GOODS, FEES, ETC.	2.11	1.62	1.55	2.49	1.92	1.88	1.47	2.23	1.69	1.19	1.45	1.16	2.48	3.88	NA	0.08	2.07	NA	NA	NA
PROPERTY INCOME	3.33	4.44	9.71	7.64	10.51	7.94	10.64	6.23	7.08	7.22	4.79	5.95	4.00	7.44	NA	15.70	10.29	NA	8.20	NA
FROM PUBLIC ENTERPRISES	2.53	3.74	8.42	6.17	9.79	6.37	9.66	4.00	3.57	7.12	4.79	5.79	3.93	7.33	NA	NA	NA	NA	8.20	NA
RENTS, ROYALTIES, INTEREST	0.80	0.70	1.29	1.46	0.72	1.58	0.98	2.23	3.51	0.09	0.00	0.15	0.07	0.11	NA	0.00	NA	NA	NA	NA
TRANSFERS FROM OTHER LEVELS OF GOV	1.11	0.93	0.68	0.05	0.02	0.10	0.00	0.00	0.06	0.09	0.03	0.00	0.00	0.00	NA	0.00	0.00	NA	NA	NA
OTHER NON-TAX REVENUE	1.03	1.38	1.20	0.45	0.87	0.32	0.98	0.47	0.26	0.23	0.46	0.98	0.31	3.14	NA	0.99	2.95	NA	0.91	NA
III. CAPITAL REVENUE	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL REVENUE	99.92	99.32	100.00	99.95	99.19	99.99	100.00	100.00	99.94	100.00	100.00	98.63	98.86	99.01	99.44	95.96	95.98	94.75	94.56	92.49
IV. GRANTS (PROGRAM)	0.08	0.68	0.00	0.05	0.81	0.01	0.00	0.00	0.06	0.00	0.00	1.37	1.14	0.99	0.56	4.04	4.02	5.25	5.44	7.51
TOTAL REVENUE AND GRANTS	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

revenue has led to a certain degree of instability in the revenue intake and this has also affected the composition of revenue. The early peaks in revenue collection seen in Figure 2.2 (1970/71 and in 1974/75) correspond to those years in which export duties peaked. Changes in export tax revenue were also the result of changes in the tax rate (it was especially high in the early 1970s). These factors explain the slight changes in the composition of revenue during these years. Another rather dramatic shift in the composition of revenues occurs during 1980/81, 1981/82 and in 1982. During these years there is a dramatic drop in revenue from international trade transactions -- import duties remained fairly stable but there was a virtual collapse in revenue from export duties.[13] This had a considerable effect on the composition of revenue: direct taxes provided about 30 percent of total revenue and taxes on domestic goods and services jumped from 27 percent of total revenue in 1979/80 to 43 percent in 1980/81. By 1984, however, the traditional pattern re-emerges.

With expenditures consistently more sizable than revenue over the two decades, the central government was constantly in deficit. The central government deficit peaked in 1975/76 at

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[13] The collapse in export duties seems to be the result of several factors. A general collapse of economic conditions meant that more people were turning away from commercial activity into subsistence. An overvalued cedi combined with a decline in cocoa production meant reduced exports and hence, reduced receipts from export taxes (and reduced receipts due to lower import levels). This was compounded by the growth of black market cocoa exports and of the parallel market in general which is not subject to taxation. (see Rimmer (1989) and May (1985))

just under 14 percent of GDP. It gradually declined to about 5 percent of GDP in the first few years of the eighties. With the onset of the Economic Recovery Program, central government deficit fell even further and in 1986 the central government budget was more or less balanced. Since 1986 the central government budget has been in surplus at about .5 percent of GDP.

ii.) Social Security and the National Insurance Trust

The Social Security Fund (later renamed the Social Security and National Insurance Trust - SSNIT) was established in 1965 and its surpluses have been an important source of finance for the central government. The scheme provides mainly pension benefits, but there are also provisions for invalidity, survivor's, sickness and employment benefits. It is financed by contributions equivalent to 12.5 percent of the employees remuneration from the employer and 5 percent from the employee himself. Any establishment with over five employees is required to join the scheme. Government workers have taken part since 1973. While contributions to the system have not always been up to date (in 1974/75 the known arrears in contributions amounted to ¢33 million[14]), the Social Security Fund has not yet had to pay out much in the way of benefits and thus has had consistent surpluses over the past twenty years (see Table 2.3).

[14] World Bank data.

TABLE 2.3 OPERATING SURPLUSES OF OTHER PUBLIC SECTOR ENTITIES (PERCENT OF GDP)

	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982	1983	1984	1985	1986	1987	1988
SSNIT																				
REVENUES	0.89	1.07	1.25	1.96	1.33	2.55	2.64	1.51	0.88	1.07	0.71	0.62	0.94	0.76	0.33	0.44	0.61	-1.20	1.10	1.20
EXPENDITURES	0.32	0.34	0.24	0.29	0.35	0.40	0.58	0.46	0.29	0.24	0.21	0.14	0.25	0.26	0.12	0.20	0.27	0.36	0.34	0.43
NET FINANCING NEEDS	-0.57	-0.73	-1.02	-1.67	-0.98	-2.15	-2.07	-1.05	-0.59	-0.83	-0.50	-0.48	-0.69	-0.50	-0.21	-0.24	-0.35	-0.84	-0.76	-0.77
COCOA MARKETING BOARD 1/																				
NET OP. SURPLUS(+)/DEF(-)	-0.29	-0.12	0.08	0.02	-0.01	-0.91	-1.65	-0.29	0.22	-0.34	-0.45	-0.03	-2.66		0.17	0.95	-0.16	1.27	2.06	1.03
GHANA INDUSTRIAL HOLDING CO. 2/																				
NET OP. SURPLUS(+)/DEF(-)	0.30	0.00	-0.07	-0.02	0.03	0.03	0.05	0.13	0.06	0.05	0.05	0.06	0.08		0.02	0.01	0.06	0.13	NA	NA
"CORE" STATE-OWNED ENTERPRISES																				
NET OP. SURPLUS(+)/DEF(-)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.88	2.26	3.54	4.59	-0.13

SOURCE: WORLD BANK AND IMF DATA
1/ DATA IN FISCAL YEARS THROUGHOUT THE PERIOD, SO 1983=1982/83 ETC.
2/ DATA IN CALENDAR YEARS SO 1969/70=1969.

Until 1986, the SSNIT was required to invest its surpluses in government paper and as a result it was a substantial holder of medium-term government securities. When such securities were not available, the SSNIT deposited the balance of the surplus with the Bank of Ghana (until the government's next issue of securities). Since 1986, the SSNIT has been allowed to make its own choices regarding its asset structure.

iii) The state-owned enterprises

The state-owned enterprise sector (SOEs) in Ghana is quite large. Most of the state enterprises were created in the 1960s and early 1970s to meet particular economic and social objectives. In 1986, the state-owned sector consisted of 181 companies in which the government had majority ownership and 54 companies in which the government was minority shareholder. In general the state-owned sector has not lived up to expectations and the return on the sizable investment required and on loans has been low. As a result the state-owned sector has placed a heavy financial and managerial burden on the central government. Data back to 1970 are available for two parts of the state-owned sector -- for the Cocoa Marketing Board and for the Ghana Industrial Holding Corp. For the rest of the state-owned sector data only become available in 1984. After considering the data on the Cocoa Marketing Board and on the Ghana Industrial Holding Corp., we will take a look at the scattered evidence on the rest of the SOEs to get a general

idea of the effect that they had on the public sector deficit.

a) The Cocoa Marketing Board. The Cocoa Marketing Board (CMB) was established as a means of regulating domestic aspects of cocoa marketing and particularly as a means of stabilizing the price paid to domestic cocoa producers. It is responsible for organizing and financing the purchase and transport of cocoa beans to ports and processing plants and for marketing Ghanaian cocoa on the world market. As seen above, the most important source of central government revenue has been the export tax on cocoa. The duty payable is based on the f.o.b. export price received by the CMB for cocoa sales; the duty takes the form of a 100% tax on all receipts above a set price. This price (the price that producers receive) is set by the CMB and has often been considerably lower than world market prices.

In addition to the duties paid to the central government, the CMB at times provided loan capital to the government. At other times, however, the CMB deferred paying its taxes -- some ¢30 million in 1971/72[15]. It also found itself with a net operating deficit (after taxes) in a number of years. These have been financed directly by the Central Bank. Table 2.3 shows the net operating surpluses and deficits of the CMB (after taxes) dating back to 1969/70.

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[15] World Bank data.

b) The Ghana Industrial Holding Corp. The Ghana Industrial Holding Corporation (GIHOC) was established as a holding company in 1967 to take over the functions of the State Enterprises Secretariat. It controls the sixteen divisions that originally belonged to the Secretariat and has taken on ten more since.[16] Some of the divisions of the GIHOC, including distilleries, canneries and pharmaceuticals, have generally been profitable. Others, such as bricks, tiles and vegetable oils, have continually made losses. In general, the GIHOC did not contribute to any great extent to the consolidated public sector deficit. If anything, it helped to very slightly offset the deficit (see Table 2.3).

c) Other state-owned enterprises. For a number of reasons, there is no series of data on the profits and losses of the majority of state-owned enterprises prior to 1984. This makes assessing the deficit of the consolidated public sector particularly difficult. While complete information is not available, state-owned enterprises clearly dominate the industrial sector, and it is worth considering the information that is available.

The sources available[17] all indicate that most of the non-financial state enterprises have been making substantial

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[16] See Huq (1989), p.242.

[17] Huq (1989); Killick (1978); Rimmer (1989), and World Bank, Country Economic Memorandum (various years).

losses or earning meager profits. The only major exception to this case has been the Volta River Authority[18]. Over the past two decades (and before) many SOEs did not revalue their assets and many more have stopped fulfilling contractual obligations by not paying interest or social security contributions. Many are not even paying income tax[19].

A report from the mid-1970s, discussed some of the profit and loss figures for a few of the SOEs. In 1972, the Electricity Corporation had a profit of ¢0.6 million and the Post & Telecommunications had a profit of ¢1.2 million. Ghana Railways and Harbours made a loss of ¢0.9 million in 1971/72 and in the same year the Ghana Water and Sewerage made a loss of ¢2.2 million. The State Gold Mining Corp made a loss of ¢6.6 million in 1971/72, but turned a profit in the next fiscal year.[20]

The available information suggests that there was a significant deterioration in the SOEs functioning in the 1979-83 period. It is estimated that the operating deficit of about 100 public enterprises increased from ¢92 million in 1979 to ¢2.9 billion in 1982 or 3 percent of GDP....The net flow of budgetary transfers to the public enterprise sector was considerable during the 1979-83 period, converting on average to about ten percent of total government expenditure. Moreover

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[18] see Huq (1989), p. 241.

[19] Huq (1989), p.242.

[20] World Bank data.

the rate of interest charged on government loans was only a fraction of the market rate, entailing a significant implicit subsidy. While the government was the major source of outside financing of operating deficits and investment programs, the domestic banking system made up for the remainder of the financing needs.[21]

The scattered evidence available indicates that through 1983, the state-owned enterprises placed a considerable burden on the public sector.

A series of data on the "core" state-owned enterprises[22] is available from 1984 onward. These enterprises combined with the Cocoa Marketing Board constitute approximately 70 percent of SOE output and therefore data on their operations is a useful guide to how the state-owned sector is currently influencing the public sector deficit. As seen in Table 2.3, the consolidated accounts of these SOEs indicates that since 1984, their results have been good. These consolidated accounts, however, mask somewhat the fact that a number of the

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[21] World Bank data.

[22] The "core" state-owned enterprises include: Ghana Water and Sewerage Corporation, Electricity Corporation of Ghana, Volta River Authority, Ghana Posts and Telecommunications Corp., Ghana Airways Corp., Omnibus Services Authority, State Transport Corp., City Express Services, State Shipping Corporation (Black Star Line), Ghana Ports and Harbour Authority, Ghana Railway Corp., Ghana National Petroleum, Ghanaian Italian Petroleum Co.,Ghana Oil Co., State Gold Mining Corp., Ashanti Goldfields, Ghana Supply Commission, Ghana National Procurement Agency. The Cocoa Marketing Board is also considered one of the core Stat-owned enterprises, but since it has been discussed above, it will not be included here.

state-owned enterprises still operated at a loss. Subventions from the central government during these years amounted to ¢488.2 million in 1984, ¢679.7 million in 1985 and ¢1144.7 in 1986.[23] Although there is no way to extrapolate backwards from the more recent data to earlier years for the "core state-owned enterprises", the anecdotal evidence does seem to point to the fact that the state-owned enterprise sector placed a considerable burden upon the public sector. Hence, the measure of the consolidated public sector deficit that has been set out above should be considered as a lower bound to our estimate of the actual figure.

iv). The Central Bank

Another factor that should be taken into account when considering the public sector deficit, but that has not been taken into consideration in the consolidated deficit discussed above, is the loss incurred by the central bank. This is often referred to as the quasi-fiscal deficit.[24] The most common source of central bank losses is lending to the non-financial public sector at no or at a very low interest rate. They also may result from rescuing troubled financial institutions, exchange guarantees and from the effect of a change in the

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[23] Based on World Bank data.

[24] See Teijeiro (1989) for a general discussion of Central Bank losses and how to account for them.

real exchange rate on the net foreign asset position[25]. The difficulty in including these losses into the public sector deficit is that accounting practices vary widely between the central bank and the central government. It is clear that in Ghana the central bank has incurred substantial losses. One recent report stated that the accumulated valuation adjustments on net foreign liabilities reached ¢243 billion by end-June 1989, equivalent to more than three and a half times the net domestic credit of the banking system as a whole and over 20 percent of the GDP[26]. These devaluation losses are essentially a liability of the Treasury. The above consolidation does not take the losses of the central bank into consideration.

The consolidation of all of the available data on the income and expenditure (and net operating profits) of the various components of the public sector showed us that, even excluding complete data on the state-owned enterprises, fiscal deficits in Ghana over the past two decades have been significant. A shortcoming of this approach, however, is the fact that it does not incorporate the state-owned enterprise sector. Another difficulty is that capital expenditure tied to project lending and grants has been excluded. The evidence

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[25] Note that the central bank also makes gains from the inflation tax.

[26] World Bank data. This is a nominal loss which should be adjusted for domestic inflation.

that is available concerning these two factors indicates that in excluding them from our measure of the consolidated deficit we may be underestimating the claims that the public sector makes on resources. One way to address these problems is to define the deficit based on the financing requirements of the public sector.

2) Defining the public sector deficit based on its financing.

An alternative way of considering the size of the deficit is to consider the total financing that the government has received. Data on the total stock of central government debt outstanding can be supplemented with the claims that the central bank and the banking system have against the state-owned enterprise sector (from IFS) and with the data on public and publicly guaranteed external debt (from the World Debt Tables), in order to derive a measure of the total outstanding stocks of debt of the public sector. Differencing these data on stocks provides us with an alternative flow measure of the financing that was provided to the public sector and thus an alternative measure of the fiscal deficit.

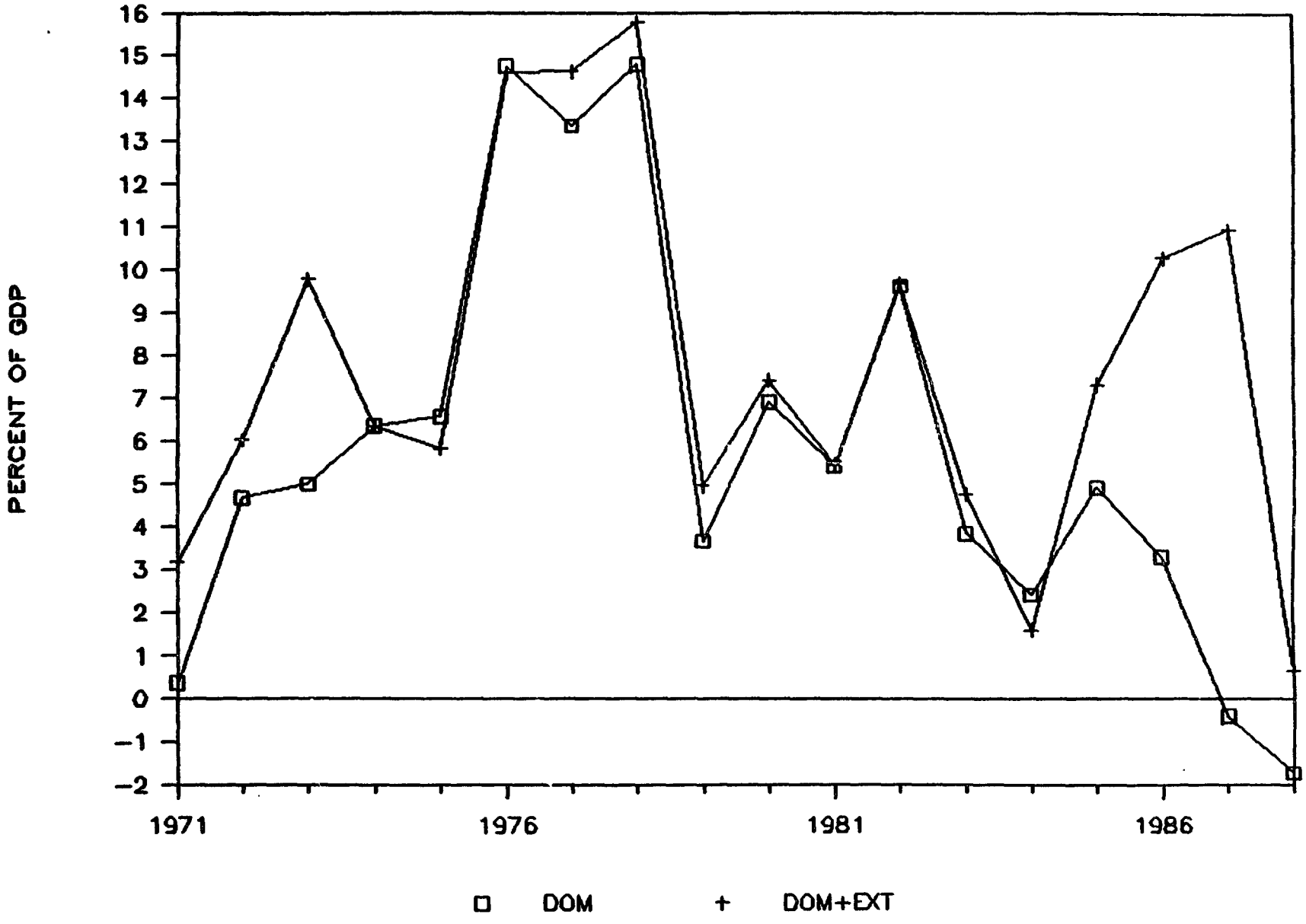
As seen in Figure 2.3[27], the public sector deficit as determined by these data is somewhat different than that determined by consolidating the accounts. This is particularly

[27] See Table 3.1 for the information on stocks underlying this figure.

FIGURE 2.3

PUBLIC SECTOR DEFICIT, 1971–88

BASED ON FINANCING



true after 1984 when external borrowing rises markedly. The line marked with squares represents domestic flows to the public sector. The line marked with crosses represents the combined domestic and external flows to the public sector. (Therefore the area between the two lines represents external borrowing.) The fiscal deficit as determined by public sector borrowing is roughly 2 percent of GDP in 1971. It rises sharply, reaching 10 percent of GDP in 1973 due to a large jump in external borrowing over 1972 and 1973. Public sector borrowing drops off in 1974 and 1975 only to jump to just 15 percent of GDP in 1976, 1977 and, 1978. This high level of borrowing is all the more remarkable given the lack of external finance. The deficit falls again to 5 percent of GDP in 1979. Three more peaks follow in 1980, 1982, and 1986 with public sector borrowing reaching 7.5, 9.7 and 10.24 percent of GDP respectively. In 1987, total public sector borrowing declined to 9.5 percent of GDP and in 1988 it dropped sharply, reaching a surplus of 0.38 percent of GDP.[28]

In general the figures given here are considerably larger than those provided by aggregating the public sector accounts. There are two principal reasons for this. The first is, as mentioned above, that the Ghanaian deficit, based on the government accounts (discussed above) excludes capital expenditure financed through external project aid and the

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[28] Note that the revaluation effects on the external debt due to changes in the cedi/$ rate have been excluded from the total financing required in Figure 2.3.

corresponding grants and loans, in other words, aid is treated as income. The project aid and other such financing are included in this measure of the deficit. This becomes particularly important after the implementation of the Economic Recovery Programme in 1984. The second reason that the finance-based estimate is larger is that it includes information on the borrowing requirements of the public enterprises, which was not complete in the government accounts.

In the case of Ghana, determining the public sector deficit from the financing side seems to provide a more comprehensive estimate than using the conventional method where the various levels of the public sector are consolidated. There are, however, some caveats to using this measure. In particular, while in principal the differencing of the stock measures should give us an accurate measure of net flows, in practice this may not always be the case. In the World Debt Tables, for example, the differencing of the total stock of public and publicly guaranteed external debt does not give us figures equal to the net flows of public and publicly guaranteed debt as listed in the Debt Tables. This is largely due to dollar revaluation effects, accounting discrepancies, and to cancellation of loan contracts. Another potential difficulty of using data on stocks to derive flows is that the effect of inflation on the value of total debt stocks is not taken into account. We address the effect of inflation on the

flows of public sector debt below, but no attempt to consider the effects of inflation on total debt stocks has been made.

With the above caveats kept in mind, it might in some cases be more appropriate to use this second definition of the deficit, particularly those where we are considering financial markets. In part II on the effect of fiscal deficits on financial markets we use the public sector deficit based on its financing. For the other parts of the study we use the conventional measure of the consolidated fiscal deficit as set out in section 1 above.

3) Economic and policy determinants of public sector deficits, 1980/81-88

Before considering how the fiscal deficit affects the key macroeconomic variables in the economy, it is useful to consider the impact that such variables may have on the fiscal deficit. Inflation is likely to affect the fiscal deficit by increasing nominal interest payments. In Ghana, we might also expect to find the Oliveira-Tanzi effect in which direct tax revenue declines during periods of high inflation as the result of collection lags. The level of the official real exchange rate is also likely to affect the fiscal deficit; any part of the deficit that is denominated in foreign currency will be affected. Changes in the real exchange rate might also have an effect on import duties and export taxes. Finally, changes in the real domestic interest rate will affect the

deficit, principally through its effect on the cost of servicing domestic debt.

This section decomposes the conventional measure of the consolidated public sector deficit[29] according to its main economic and policy determinants, including GDP growth, inflation, the real interest rate,
and a number of domestic fiscal and policy variables. The period we consider covers the fiscal years 1980/81 through 1988.[30] The methodology used is a simplified version of that set out in Marshall and Schmidt-Hebbel and also follows closely that of the Zimbabwe paper by Morande and Schmidt-Hebbel. The approach starts by identifying the main budgetary items of the consolidated public sector deficit. By using estimated tax revenue functions, and some simple variable transformations, one can decompose changes in the public sector deficit into quantifiable macroeconomic and policy determinants.

a)Tax revenue functions

The first step in the methodology is to estimate the

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[29] Because the decomposition calls for a detailed breakdown of the components of the deficit and because this detailed information is not necessarily consistent with the "financing-based" deficit measure, we choose to use the conventional measure of the deficit. It is likely to be more appropriate to use the conventional measure in this instance, because it is the one most frequently used by policymakers.

[30] Ghana switched from a fiscal year accounting basis to a calendar year accounting basis in 1982.

behavioral equations for the tax revenue functions. For Ghana we have estimated four separate functions: direct taxes, export taxes, import duties, and other indirect taxes (sales and excise taxes). These functions were estimated for the 1970/71-1988 period; the results are set out in Table 2.4.

Direct taxes depend positively on GDP which is used as a proxy for the tax base. The relationship between direct taxes and inflation is a negative one, indicating that the negative effects on income tax revenue due to collection lags. etc. (the Oliveira-Tanzi effect) outweighs the positive effect that inflation may have on direct tax revenue due to "bracket creep" (the effect traditionally discussed in the tax literature in reference to inflation in developed countries). There is a positive relationship between the real exchange rate and inflation which may be explained in two ways. A real exchange rate depreciation (an increase in our measure) is likely to lead to increased exports and thus higher income, which would increase the intake on tax revenues. Tax rates may also be higher in the traded-good sectors than in the non-traded goods sectors, leading to an increased revenue intake with a depreciation. Three dummy variables were included to take policy changes with respect to the tax regime into account. The first is for the 1974-79 period; the second marks the "first coming" of Rawlings and both the political and economic uncertainty as well as a massive deterioration in the performance of the tax administration over the period; the

Table 2.4

Estimation Results for Tax Revenue Functions (1970/71-1988)

A. Direct Taxes

$$DT_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 \pi_t + \alpha_3 RER_t + \alpha_4 D7479 + \alpha_5 D7983 + \alpha_6 D84 + \epsilon_t$$

Regression	α_0	α_1	α_2	α_3	α_4	α_5	α_6	DW	R^2
1.	-9.41	1.38	-.64	1.05	.610	.560	.370	1.91	.941
	(-2.95)	(5.51)	(-3.87)	(6.03)	(4.71)	(3.38)	(3.91)		

B. Export Taxes

$$ET_t = \beta_0 + \beta_1 EX_t + \beta_2 \pi_t + \beta_3 RER_t + \beta_4 TOT_t + \beta_5 D8082 + \epsilon_t$$

Regression	β_0	β_1	β_2	β_3	β_4	β_5	DW	R^2
1.	7.39	.54	-.09	.44	.905	-6.17	2.63	.982
	(6.57)	(1.94)	(-.14)	(.801)	(1.53)	(-16.11)		
2.	8.61	.49	-	-	-	-6.49	2.03	.978
	(28.57)	(2.66)				(-22.4)		

C. Import Duties

$$ID_t = \gamma_0 + \gamma_1 IM_t + \gamma_2 \pi_t + \gamma_3 RER_t + \gamma_4 TOT_t + \epsilon_t$$

Regression	γ_0	γ_1	γ_2	γ_3	γ_4	DW	R^2
1.	6.41	.743	.429	1.20	.624	2.29	.84
	(17.56)	(3.37)	(1.40)	(5.22)	(2.11)		
2.	6.63	.708	-	1.03	.714	2.58	.82
	(19.54)	(3.13)	-	(5.14)	(2.39)		

D. Other Indirect Taxes

$$OIT_t = \lambda_0 + \lambda_1 Y_t + \lambda_2 \pi_t + \lambda_3 D79 + \lambda_4 D73_t + \epsilon_t$$

Regression	λ_0	λ_1	λ_2	λ_3	λ_4	DW	R^2
1.	-16.5	2.05	-1.41	-.28	-.66	1.93	.78
	(-2.85)	(4.53)	(-6.26)	(-1.17)	(-2.64)		
2.	-14.7	1.91	-1.40	-	-.62	1.63	.76
	(-2.60)	(4.32)	(-6.17)	-	(-2.49)		

Note: All regressions were performed on real variables in logs (except for those variables that are indices and dummies) using OLS. Residual autoregressions for each final equation did not show evidence of autocorrelation.

last marks the beginning of the structural adjustment program and efforts to improve revenue mobilization. All three variables have a positive, significant relationship with direct tax revenues.

For export taxes, an index of export volume was used as the base. Inflation, the real exchange rate, the terms of trade, and a dummy for the period between 1980-82 were also included in the estimation, but only exports and the dummy variable were significant. Export taxes are positively related to exports and very strongly and negatively related to the dummy variable. This dummy variable reflects three years when export tax revenue plummets (as discussed above). The cause may be because in the early eighties those cocoa producers who were still producing were likely to be selling their cocoa on the black market. Another factor that may have contributed is the breakdown in tax administration due to the severe economic crisis during those years.

Import duties were regressed on an index of import volume, inflation, the real exchange rate and the terms of trade. An increase in imports is shown to have a positive effect on import duties. Inflation was found to be insignificant. An depreciation in the real exchange rate was found to have a positive effect on import duties. This may result from the fact that an increase in the real exchange rate would assist exports thereby improving access to the foreign exchange necessary to import. To the extent that the

ability to export increases the ability to import, a depreciation in the currency could lead to a rise in revenue from import duties. A depreciation also raises import tax revenue by increasing the domestic value of imports. An increase in the terms of trade (defined here as the unit value of exports over the unit value of imports) was also found to increase import duties. This is likely to be due to the fact that an improvement in the terms of trade allows a country to import more and thus to increase its revenue from import duties.

The last revenue function estimated is that for "other indirect taxes" e.g. sales taxes and excise duties. We regress other direct taxes against GDP (a proxy for the tax base) inflation, the real exchange rate and a number of dummy variables for policy shifts and/or changes in regime. Other indirect taxes are positively related to GDP, and negatively related to inflation . A dummy variable for a shift in regime in 1973 is significant and negatively related to other indirect taxes. The other dummy variables tested were not significant.

b) Decomposition of the public sector deficit

According to the methodology set out in Marshall and Schmidt-Hebbel (1989), Table 2.5 sets out the changes in the main economic and policy determinants of the fiscal deficit from 1980/81 through 1988. The domestic macroeconomic

Table 2.5
Ghana
Changes of Economic and Policy
Determinants of Consolidated Non-Financial
Public Sector Deficit 1/

	80/81	81/82	1982	1983	1984	1985	1986	1987	1988
1. Domestic variables									
Real GDP (Y^)	0.070	-0.202	-0.158	0.007	0.026	0.051	0.052	0.048	0.062
Exports (EX^)	-0.045	-0.005	0.048	-0.279	0.020	0.211	0.108	0.077	0.123
Imports (IM^)	-0.022	-0.162	-0.217	-0.102	0.270	0.112	0.148	0.129	0.047
Domestic i rate-real (dr)	-0.149	0.183	0.276	-0.946	0.709	0.284	-0.191	0.055	0.082
Domestic inflation (dP^)	0.179	-0.198	-0.321	0.986	-0.674	-0.229	0.211	-0.025	-0.057
Real exchange rate (RER^)	-0.350	-0.389	-0.071	0.487	2.044	0.417	0.348	0.277	0.042
2. Foreign Variables									
Foreign i rate n(dio)	0.020	-0.005	-0.017	-0.021	0.010	-0.021	-0.015	-0.001	0.008
Terms of Trade (TOT^)	-0.170	-0.253	-0.105	0.067	0.302	-0.059	0.125	-0.083	-0.078
3. Policy Variables									
Foreign debt (De/Pe)^	-0.065	-0.061	-0.020	0.018	-0.078	0.086	0.293	0.246	0.012
Domestic debt (D/P)^	-0.196	-0.042	0.061	-0.205	-0.218	-0.049	-0.053	-0.321	-0.347
Wage bill (WB/P)^	0.108	-0.299	-0.109	-0.228	-0.017	1.279	0.273	-0.015	0.032
Goods and services (GS/P)^	-0.103	-0.078	0.021	-0.183	1.050	0.036	-0.131	0.103	0.085
Transfers and subsidies (TS/P)^	-0.155	-0.243	0.116	-0.151	-0.276	0.150	-0.121	-0.064	0.103
SOE net op. surplus (PD/P)^ 2/	3.938	-4.017	-1.241	-0.232	2.201	-0.730	5.919	0.402	-0.332
Investment (I/P)^ 3/	0.395	-0.517	-0.179	-0.339	0.975	0.720	-0.027	0.352	0.220
Policy dummy- dir taxes (dD7479)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Policy dummy- dir taxes (d7983)	0.000	0.000	0.000	0.000	-1.000	0.000	0.000	0.000	0.000
Policy dummy-post 84 dir tax(dD84)	0.000	0.000	0.000	0.000	1.000	-1.000	0.000	0.000	0.000
Policy dummy-8082, Exp. tax (dD8082)	1.000	0.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000
Policy dummy-oth.ind.taxes (dD73)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1/ Due to limited data availability includes central government, SSNIT, CMB, GIHOC, but not other state-owned enterprises.
2/ Net operating surpluses or deficits of the SSNIT, CMB and GIHOC.
3/ Capital expenditure of central government and SSNIT.

variables considered are real GDP, real exports, real imports, the real interest rate (as defined by the Fisher equation), inflation (as measured by the change in the GDP deflator), and the real exchange rate. Two foreign variables are considered, the nominal interest rate and the terms of trade.

A set of policy variables is also considered including the real domestic and foreign debt stocks, the government wage bill, government spending on other goods and services, and government transfers and subsidies. Public sector net operating surpluses (for those SOEs for which the data is available) and public investment are also considered as policy variables. Finally, there are five "policy" or "regime" dummies which are indicative of either changes of regime or periods where there was massive erosion in tax collection.

Table 2.5 shows that until 1983 real GDP growth was close to zero or negative. Since 1984 it has picked up considerably reaching 6.2 percent in 1988. Both export and import growth have picked up since the adjustment program in 1984. Changes in the domestic real interest rate have been erratic, largely reflecting dramatic changes in the inflation rate given controls on the nominal rate. Inflation has been unstable over the period under consideration, though in recent years the changes have not been so dramatic. Finally, the changes in the real exchange rate reflect the cedis depreciation over the period. Particularly noteworthy is the depreciation of more than 200 percent in 1984.

The changes in foreign variables indicate that the nominal foreign interest rate has for the most part remained stable. The terms of trade on the other hand has not.

Finally, table 2.5 also shows some of the policy variables over which the government has somewhat more control. From 1984 onward foreign debt increased dramatically and domestic debt declined dramatically. The real wage bill fell throughout the period until 1985 when there was a large jump. The changes in spending on goods and services were mostly negative until 1984 when a large jump occurred. After 1984 spending tended to increase from year to year. Transfers and subsidies have not followed any systematic pattern. Nor have SOE net operating surpluses which show significant changes from year to year (both positive and negative). Prior to the adjustment program public investment fell dramatically. Since 1984, it has grown considerably each year (with the exception of 1986).

Table 2.6 sets out the decomposition of the consolidated public sector deficit into the main budgetary variables (This breakdown reflects a simplified version of equation (17) in Marshall and Schmidt-Hebbel (1989) or alternatively equation (4) in the appendix of the Zimbabwe paper.). Note that both domestic and foreign interest payments have been determined implicitly, using the interest rate and the stock of domestic and foreign debt, respectively. The table also includes a residual which incorporates those items of the deficit which

Table 2.6
Ghana
Decomposition of the Consolidated
Non-financial Public Sector Deficit, /1
According to Changes in Budgetary Variables
(Ratios to GDP)

	80/81	81/82	1982	1983	1984	1985	1986	1987	1988
I. Changes of Included Variables									
Wages	0.004	-0.010	-0.002	-0.006	-0.001	0.023	0.009	-0.003	-0.001
Other Goods & Serv.	-0.002	-0.001	0.001	-0.004	0.019	-0.001	-0.007	0.002	0.001
Transfers & Subs.	-0.005	-0.006	0.004	-0.004	-0.007	0.001	-0.003	-0.002	0.000
Direct Taxes	-0.002	0.002	0.001	-0.007	0.005	0.007	0.005	0.005	0.006
Export taxes	-0.026	0.000	-0.000	0.016	0.002	0.008	0.001	0.008	-0.013
Import duties	-0.005	0.002	-0.003	0.004	0.001	0.008	0.009	-0.004	0.000
Other Indirect Taxes	0.001	-0.000	0.001	-0.016	0.012	0.006	0.012	-0.003	0.001
Dom. i payments (impl.)	-0.000	-0.003	-0.006	0.002	-0.001	-0.002	-0.000	-0.005	-0.005
For. i payments (impl.)	-0.002	-0.002	-0.001	0.001	0.009	0.001	0.002	0.008	0.003
SOE n.o.s. (+=def, - sur)/2	-0.005	0.028	-0.028	0.001	-0.008	0.009	-0.018	-0.007	0.010
Investment	0.007	-0.012	-0.002	-0.004	0.006	0.009	-0.002	0.006	0.004
Explained Sum	0.004	-0.008	-0.030	0.004	-0.009	0.020	-0.046	-0.007	0.001
II. Chgs. of Excl. variables /3	0.022	0.013	-0.009	-0.022	-0.008	-0.006	0.005	-0.005	0.011
Consolidated Public Sector Deficit	0.027	0.005	-0.039	-0.018	-0.017	0.013	-0.041	-0.012	0.012

/1 Data for the Consolidated Public Sector in Ghana include the Central Government, Social Security and National Insurance Trust, the Cocoa Marketing Board, and the GHana Industrial Holding Corp.Data for other SOEs not availabl
/2 This is the net operating surplus/ deficit of the SSNIT, CMB and GIHOC.
/3 Residual which includes changes in those factors not considered explicitly.

were not explicitly treated either for lack of detailed data or because they are relatively insignificant.

Finally, Table 2.7 sets out the final results of the decomposition which allows us to identify the changes in the consolidated fiscal deficit according to their underlying macroeconomic and policy causes. The effect of the main macroeconomic variables has by and large been negative. Consider 1984 as an example. In this year the main macroeconomic variable contributing to a reduction in the deficit was inflation; the positive effect of a reduction in inflation reduced the deficit by 21.6 percentage points of GDP (note that in 1983 the converse happened and inflation contributed to an increase in the deficit by 35.8 percentage points). At the same time changes in the real interest rate increased the deficit by 11.3 percent of GDP. The positive effect of GDP growth on tax bases (the economic effect) contributed to a reduction in the deficit of .7 percentage points of GDP; and the "denominator effect" (due to the fact that the deficit and every budget item are expressed as ratios to GDP) reduced the budget deficit by .2 percentage points of GDP. The other variables can be analyzed in a similar way. The table indicates that the dramatic changes in macroeconomic variables in 1983 and 1984, particularly changes in the inflation rate had a strong impact on the fiscal deficit. These effects have become less pronounced over the past five years as the Ghanaian economy has grown more stable.

TABLE 2.7
GHANA
DECOMPOSITION OF THE CHANGES IN CONSOLIDATED
NON-FINANCIAL PUBLIC SECTOR DEFICITS 1/
ACCORDING TO CHANGES IN ECONOMIC AND POLICY VARIABLES
(Ratios to GDP)

	80/81	81/82	1982	1983	1984	1985	1986	1987	1988
1. Changes Due to Domestic Variables									
Real GDP (Y^)-denominator	-0.008	0.027	0.019	-0.001	-0.002	-0.004	-0.005	-0.003	-0.004
Real GDP (Y^)- numerator	-0.017	0.057	0.042	-0.002	-0.007	-0.013	-0.013	-0.012	-0.015
Exports (EX^)	0.002	0.000	-0.002	0.012	-0.001	-0.007	-0.004	-0.003	-0.006
Imports (IM^)	0.001	0.011	0.012	0.004	-0.011	-0.006	-0.008	-0.008	-0.0[illegible]
Domestic i rates (real-dr)	-0.034	0.034	0.051	-0.191	0.118	0.028	-0.021	0.005	0.005
Domestic inflation (dP^)	0.069	-0.057	-0.110	0.358	-0.216	-0.065	0.057	-0.006	-0.013
Real Exchange Rate (RER^)	0.008	0.005	0.001	-0.004	-0.026	-0.016	-0.021	-0.023	-0.004
2. Changes Due to Foreign Variables									
Foreign nom. i. rate (die)	0.002	-0.000	-0.001	-0.001	0.001	-0.003	-0.003	-0.000	0.004
Terms of Trade (TOT^)	0.018	0.016	0.005	-0.003	-0.014	0.004	-0.007	0.005	0.004
3. Changes Due to Policy Variables									
Foreign Debt (De/Pe)^	-0.001	-0.000	-0.000	0.000	-0.000	0.001	0.004	0.004	0.000
Domestic Debt (D/P)^	-0.006	-0.001	0.002	-0.004	-0.005	-0.001	-0.001	-0.007	-0.005
Wage Bill (WB/P)^	0.004	-0.012	-0.003	-0.006	-0.000	0.025	0.012	-0.001	0.002
Goods and Services (GS/P)^	-0.003	-0.002	0.000	-0.004	0.020	0.001	-0.005	0.003	0.003
Transfers and Subsidies (TS/P)^	-0.005	-0.007	0.003	-0.004	-0.006	0.002	-0.002	-0.001	0.001
SOE net op. surplus (PD/P)^2/	-0.005	0.027	-0.026	0.001	-0.009	0.009	-0.019	-0.008	0.009
Investment (I/P)^ 3/	0.007	-0.013	-0.002	-0.004	0.007	0.010	-0.001	0.007	0.006
Policy dummy- dir taxes (dD7479)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Policy dummy- dir taxes (d7983)	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Policy dummy-post 84 dir tax(dD84)	0.000	0.000	0.000	0.000	-0.000	0.001	0.000	0.000	0.000
Policy dummy-8082, Exp. tax (dD8082)	0.019	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000
Policy dummy-oth.ind.taxes (dD73)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUM OF EXPLAINED CHANGES	0.062	0.016	-0.052	0.154	-0.149	-0.020	-0.024	-0.036	-0.001
UNEXPLAINED CHANGES	-0.036	-0.011	0.012	-0.172	0.131	0.034	-0.017	0.024	0.013
CHANGE IN CPSD	0.027	0.005	-0.039	-0.018	-0.017	0.013	-0.041	-0.012	0.012

1/ Due to limited data availability includes central government, SSNIT, CMB, GIHOC, but not other state-owned enterprises.
2/ Net operating surpluses or deficits of the SSNIT, CMB and GIHOC.
3/ Capital expenditure of central governemnt and SSNIT.

Finally, Table 2.7 shows that the policy variables under the government control have generally not had as much impact on the deficit as the macroeconomic variables have had. We see that the large wage increase in 1985, contributed a 2.5 percentage increase in the deficit, but that the effects of other policy variables in this year were relatively small. As with the macroeconomic variables, more stable policy variables in recent years have led to much smaller impacts upon the deficit.

III.) FISCAL DEFICITS AND FINANCIAL MARKETS

It was not until the mid-sixties that the economic literature began to integrate the effects of deficit financing on asset markets into discussions of fiscal policy. Earlier analyses did not allow for the fact that fiscal and monetary policies might imply changes in private sector portfolios and hence changes in private sector wealth. The early analyses (Christ (1968), Blinder and Solow (1974)) are referred to as the "government budget constraint literature." As its name implies this literature sets out the government budget constraint (the fiscal deficit must equal the sum of domestic borrowing, external borrowing and money creation) and considers the impact that changes in the method of financing the deficit have on portfolio holdings and the resulting effect on output.

The strand of the literature concerning the relationship between fiscal deficits and inflation is referred to as the "public finance approach to inflation", [31] and is based on the work of Phelps (1973), Dornbusch (1977), and Buiter (1983, 1985), among others. Van Wijnbergen (1982), van Wijnbergen et al (1989) and Easterly (1989a) extend and undertake applications of this framework in various developing countries.

Like the government budget constraint literature, this strand relies on the government budget constraint, but the

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[31] See van Wijnbergen (1989), p. 1.

focus here is on money creation as a source of finance. In these models, inflation is determined as a residual tax. It is a residual because, given constraints on external borrowing and the willingness of the public sector to hold public debt, the government must turn to money creation to cover the gap. To the extent that rate of money creation exceeds the rate of growth of the demand for money balances it will be inflationary. Inflation acts as a tax because it forces the private sector to reduce expenditure just to maintain the real value of money balances it wishes to hold for a given rate-of-return structure. Van Wijnbergen et al (1989) emphasize that in the short run demand pressure or cost-push factors may be important determinants of inflation, but they argue these factors contribute little to the understanding of sustained inflation.

In the previous section we saw that over the past two decades Ghana has had large public sector deficits. This part of the study focuses on the way in which Ghana chose to finance these deficits and how these decisions may have affected the financial (as opposed to real) side of the economy. In general, until the implementation of the adjustment program, the government relied on money creation as the principal method of finance which led to high rates of inflation[32]. In the heavily controlled Ghanaian economy, these

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[32] Other factors, such as supply shocks, as well as money creation contributed to the two price shocks of 1981 and 1983. See Chhibber and Shafik (1990).

high rates of inflation resulted in negative real interest rates and, because of the fixed nominal exchange rate, in overvaluation of the currency. These in turn implied implicit taxes on financial intermediation and reduced incentives for exports. They also implied increasingly high returns in the informal economy which eventually became pervasive. All of this served to erode the tax base, thus increasing the deficit and leading to more money creation and the continuation of the vicious circle.

In the first half of this section we consider the means of finance that the government used and trace through some of the implications for the economy. In the second half we focus on the tradeoffs between inflation and seignorage revenue in Ghana and consider some alternative scenarios using a simple model based on the model suggested in Appendix II of Easterly et al (1989).

1.) Financing the Deficit

Table 3.1 provides a detailed breakdown of the financing components of the public sector deficit. As discussed in the previous section, access to external borrowing prior to 1984 was limited. External debt flows (minus revaluation) generally ranged between -0.74 and 1.62 percent of GDP with the exception of 1973, in which the flow of external financing was 4.86 percent of GDP. With the Economic Recovery Programme and the arrangement of a structural adjustment program, external

Table 8.1: Financing of Public Sector Debt

(IN PERCENT OF GDP)	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
FLOWS OF OUTSTANDING CENTRAL GOV'T DOMESTIC DEBT:		0.16	3.01	3.20	4.08	7.39	13.25	13.10	11.61	1.81	6.17	3.45	6.58	6.44	1.33	1.42	2.63	-0.37	-0.58
BY HOLDINGS:																			
MONETARY AUTHORITIES		1.58	1.03	0.17	3.25	5.00	8.23	9.14	9.37	-0.13	3.32	2.39	2.11	4.13	1.16	0.51	1.10	-0.44	-1.13
COMMERCIAL BANKS		-2.14	1.35	0.79	-0.83	0.02	1.59	2.02	0.47	1.27	1.00	0.38	1.63	1.02	-0.13	0.20	0.01	0.13	0.02
SECONDARY BANKS		0.00	0.00	0.00	0.00	0.28	0.48	0.18	0.11	0.24	0.35	0.28	0.59	0.37	-0.10	0.58	0.89	-0.28	-0.67
SOCIAL SECURITY FUND		0.74	0.83	2.28	-4.77	1.90	2.34	0.97	0.68	0.53	0.49	0.28	0.24	0.26	0.18	0.15	0.63	0.18	0.68
PRIVATE SECTOR		0.00	0.00	0.00	0.00	0.47	0.97	0.68	0.71	-0.08	0.91	0.14	1.92	0.28	0.02	0.01	-0.05	0.07	0.30
PUBLIC ENTERPRISES/		0.00	0.00	0.00	0.00	-0.28	-0.35	-0.09	0.18	-0.01	0.11	0.00	0.03	0.39	0.22	-0.04	-0.04	-0.03	0.12
CLAIMS ON NONFIN. SOEs BY CB		0.20	1.31	-2.29	1.49	-1.04	0.27	-0.17	2.58	1.65	0.59	1.16	3.21	-2.62	1.23	2.84	0.88	-0.11	-1.31
CLAIMS ON NONFIN. SOEs BY DMBS		0.00	0.36	4.10	0.80	0.24	1.23	0.43	0.72	0.20	0.18	0.81	-0.10	0.04	-0.14	0.87	0.10	0.10	0.18
TOTAL FLOWS OF OUTSTANDING PUBLIC SECTOR DEBT		0.36	4.68	5.01	6.37	6.59	14.75	13.36	14.00	3.66	6.94	5.42	9.64	3.98	2.42	4.92	3.29	-0.39	-1.72
EXTERNAL DEBT FLOWS(END DEC.)		18.37	-8.69	2.73	0.00	-0.74	-0.18	1.28	6.94	1.31	0.50	0.05	0.08	17.24	7.73	5.65	14.34	30.34	13.22
REVALUATION		16.63	-10.06	-2.08	0.00	0.00	0.00	0.00	5.96	0.00	0.00	0.00	0.00	16.82	8.64	3.24	7.34	19.01	10.83
EXTERNAL DEBT MINUS REVALUATION		2.04	1.38	4.79	0.00	-0.74	-0.18	1.28	0.98	1.31	0.50	0.05	0.08	0.91	-0.91	2.41	7.01	11.33	2.39
TOTAL PUBLIC SECTOR DOM. & EXT. DEBT		3.20	6.05	9.80	6.37	5.85	14.59	14.62	15.78	4.97	7.44	5.47	9.70	4.77	1.61	7.34	10.29	10.94	0.67
INTEREST PAYMENTS		1.62	2.06	1.59	1.60	1.40	1.53	1.59	1.15	1.82	1.69	1.41	2.61	1.20	1.27	1.48	2.22	2.42	1.18
PRIMARY DEFICIT		1.58	4.00	8.21	4.88	4.45	13.08	13.03	14.63	3.15	5.75	4.08	7.19	3.57	0.34	5.85	8.07	8.52	-0.48

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
OUTSTANDING STOCKS OF CENTRAL GOV'T DOMESTIC DEBT:	29.20	28.64	28.69	24.87	22.54	27.28	35.24	33.75	29.47	23.73	21.80	16.31	20.23	15.98	12.16	11.01	9.91	8.42	3.96
BY HOLDINGS:																			
MONETARY AUTHORITIES	9.23	9.90	9.83	8.07	9.32	13.21	18.92	20.20	20.12	14.83	13.08	10.10	10.69	9.12	7.35	6.31	5.33	5.21	1.13
COMMERCIAL BANKS	5.12	2.87	3.72	3.78	2.21	1.97	3.19	3.89	2.54	3.16	3.08	2.21	3.49	2.87	1.68	1.52	1.02	0.83	0.81
SECONDARY BANKS	NA	NA	NA	NA	1.34	1.46	1.84	1.14	0.72	0.78	0.86	0.78	1.26	0.96	0.55	1.02	1.57	0.81	0.00
SOCIAL SECURITY FUND	14.65	13.97	13.04	12.74	4.80	6.13	7.31	5.24	3.45	3.09	2.52	1.75	1.71	1.06	0.88	0.85	1.19	0.98	1.37
PRIVATE SECTOR	NA	NA	NA	NA	1.80	2.08	2.84	2.42	2.00	1.41	1.84	1.22	2.96	1.65	1.14	0.92	0.68	0.46	0.82
PUBLIC ENTERPRISES	NA	NA	NA	NA	3.09	2.48	1.84	0.87	0.84	0.48	0.41	0.26	0.24	0.50	0.57	0.41	0.23	0.13	0.22
CLAIMS ON NONFIN. SOEs BY CB	6.07	4.78	5.58	2.18	3.18	1.72	1.88	0.81	2.99	3.87	3.14	3.02	5.74	0.08	1.29	3.68	3.11	2.02	0.11
CLAIMS ON NONFIN. SOEs BY DMBS	0.04	0.04	0.39	4.41	4.12	3.87	4.36	2.98	2.31	1.91	1.44	1.68	1.29	0.84	0.30	1.10	0.84	0.67	0.65
TOTAL STOCK OF OUTSTANDING PUBLIC SECTOR DEBT	34.31	31.35	32.64	31.16	29.79	32.87	41.36	37.54	34.77	29.52	26.38	20.90	27.27	18.69	18.75	15.77	13.98	9.12	4.71
EXTERNAL DEBT (END DEC.)	22.00	38.24	26.28	23.05	17.32	14.54	11.61	8.05	11.22	9.65	8.85	4.09	3.50	18.89	20.65	21.98	29.01	50.22	48.03
MEMO ITEMS:																			
GDP	2269	2601	2815	3502	4860	5283	6529	11163	20988	28222	42853	72828	86451	183638	270581	848049	611373	748600	1067888
Nom. Exchange Rate (Cedi/$, EOP	1.02041	1.01818	1.28	1.14999	1.14999	1.14999	1.14999	1.14999	2.74997	2.74997	2.74997	2.74997	2.74997	30.003	50	59.988	90.009	176.058	229.885

borrowing increased reaching 9.89 percent of GDP in 1987. Before the ERP, Ghana was effectively required to finance her deficits domestically.

The decomposition of domestically held public debt shows that the principal financier to the government has been the Bank of Ghana. In the first years of the seventies debt held by the monetary authorities was relatively small, even negligible in 1973. It increased to 3.25 percent of GDP in 1974 (presumably to pay back the debts owed to the commercial banks and the Social Security Fund given the negative sign on their lending flows in that year). Over the next four years the government's reliance on the monetary authorities was extremely high: 5 percent of GDP in 1975, 8.23 percent in 1976, 9.14 percent in 1977, and 9.37 percent in 1978! It then dropped sharply to -0.13 percent in 1979, rose again to 3.32 percent in 1980 and 2.38 percent in 1981. In 1982, central bank financing was 2.11 percent of GDP and rose to 4.12 percent of GDP in 1983. After 1984, reliance on the central bank was greatly reduced. In at least half of the years considered, the financing provided by the central bank to the central government was greater than all other domestic financing sources combined. Over the same period, the state-owned enterprises also depended on the central bank for financing.

The other notable source of finance for the central government is the Social Security Fund. As mentioned in part

II, the Social Security Fund was until recently required to invest its surpluses (which in many years were considerable) in government stocks. Thus the Social Security Fund was a captive source of finance.

The reliance on borrowing from the commercial banks has generally been low, with a peak of 2.02 percent of GDP in 1977. Borrowing from the secondary banks has also been fairly low, ranging between -0.58 and .59 percent of GDP. As can be seen from Table 3.1, in more recent years the government has actually been paying off its debt to the central bank and to the secondary banks. Borrowing from the private sector and from public enterprises has not been a significant source of finance for the government.

From 1985 onward, domestic borrowing falls relative to the rest of the period. The rise in external borrowing during this period suggests that with the onset of the structural adjustment program the government has been able to substitute external finance for domestic finance.

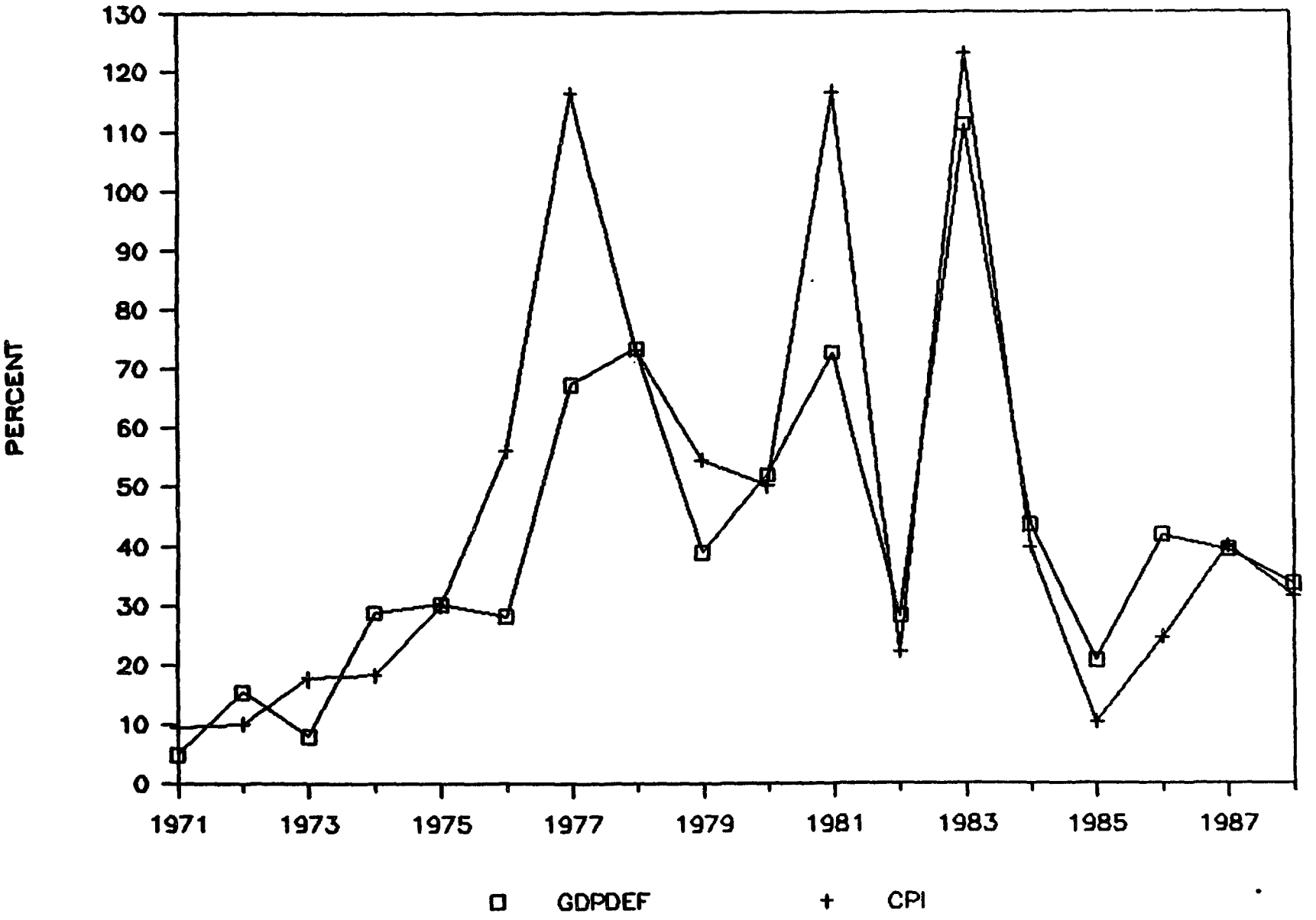
The overall picture is thus one where the government relied heavily on borrowing from the central bank to finance its deficits until 1985, when it obtained the option of substituting foreign borrowing for domestic borrowing. To the extent that borrowing from the central bank led to an increase in the supply of money balances that surpassed the increase in demand for money balances, such borrowing implies inflationary consequences.

In Figure 3.1 the GDP deflator and CPI inflation rates are set out. The two indices more or less follow the same pattern with three price shocks coming in 1977, 1981, and 1983. If we compare these inflation rates with Figure 2.3 of public sector deficits defined from the financing side, and with the data on the government's sources of financing, the relationship between the reliance on money creation in the mid-late seventies and high levels of inflation seems fairly clear. Heavy dependence on monetary finance began in 1976, the year in which the sharp rise in inflation began. In 1977 and 1978, reliance on money creation remained high but inflation began to drop, and in 1979 both fell sharply. For the rest of the period, however, the relationship between the deficit and inflation seems somewhat less clear. In 1980, borrowing from the central bank is 3.32 percent of GDP (as opposed to 9.14 percent of GDP in 1977). It falls to about 2.11 percent in 1982. It rises to 4.12 percent of GDP in 1983, the third year of price shock. Thereafter the reliance on borrowing from the central bank declines, and in 1987 and 1988 the government pays back some of its debt to the central bank.

The inflation that results from money creation (and from other sources) affects other areas in the economy. In Ghana interest rates have been controlled until very recently. The high inflation rates that Ghana experienced over the period

FIGURE 3.1

INFLATION RATES, 1971–1988



thus imply negative real interest rates[33]. Figure 3.2 shows nominal and real deposit and lending rates from 1971 through 1988. We can see from these figures that both deposit and lending rates have been negative throughout the period. Despite the recent liberalization of interest rates, with the exception of 1985, real rates have remained negative. The spread between the nominal deposit and lending rate is also presented in Figure 3.2. Up until 1980 the spread between the two rates was fairly stable at about 3.33 percent through 1974 and then at 2.5 percent through 1980. In 1981 the spread fell to almost zero, it then jumped dramatically to over 5 percent[34]. It has varied considerably over the rest of the period. Such an interest rate spread reflects the costs of financial intermediation as well as implicit taxes on such intermediation in the form of reserve requirements, deposit restrictions etc.

Nevertheless, negative real interest rates and taxes on

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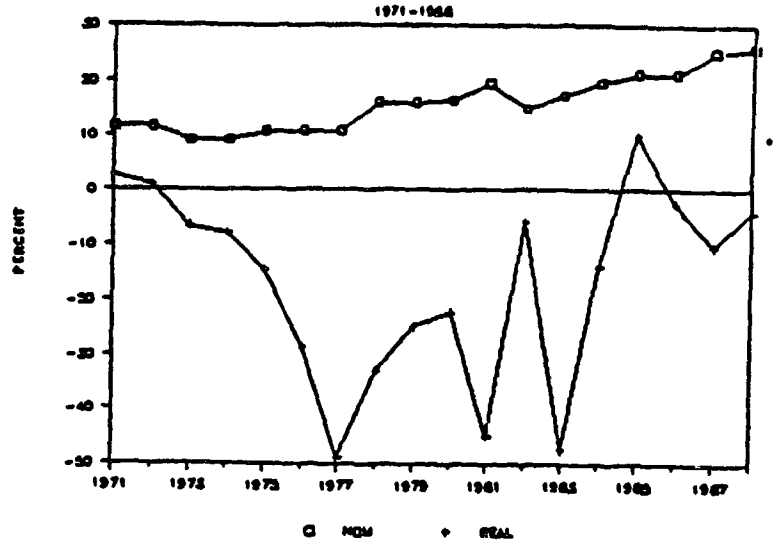
[33] Real interest rates are calculated as ((1+r)/(1+p)-1)*100, where r is the nominal rate of interest and p the CPI inflation rate.

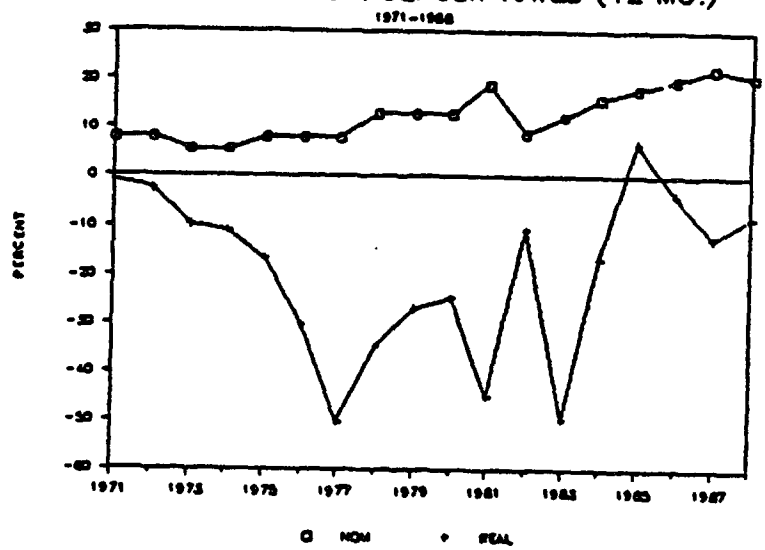
[34] While some of the instability after 1981 may be attributed to inflation the sharp decline and rise in the spread is partly due to sizeable changes in the nominal deposit rate. In 1980, the nominal rate on 12 month deposits was 13 percent it increased by six percent in 1981 to 19 percent and then dropped dramatically to 9 percent in 1982. It then rose to 12.5 percent in 1983. The lending rate was slightly more stable at 16, 16.5, 19.5,15 and 17.3 percent for the years mentioned.It seems quite plausible that this instability was caused by the change in government during those years given that interest rates were heavily controlled at the time.

FIGURE 3.2

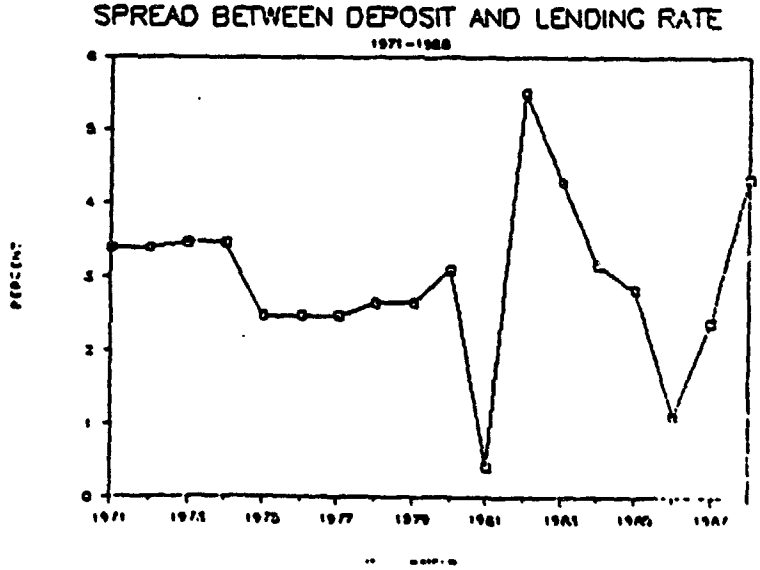
NOMINAL AND REAL AVG. LENDING RATES



NOMINAL AND REAL DEPOSIT RATES (12 MO.)



SPREAD BETWEEN DEPOSIT AND LENDING RATE



financial intermediation reduce the return on assets in the economy and thus reinforce any tendencies toward financial disintermediation that may have already occurred as the result of inflation. In Ghana, the negative real interest rates in the formal financial system, combined with strict credit allocation, encouraged the development of an extensive network of informal credit markets. Financial disintermediation was also encouraged by a currency conversion in 1979, whereby a proportion of the currency holdings in private hands was expropriated and by demonetization of the largest currency notes (50 cedi) in 1982.

In addition to leading to negative interest rates, the inflation that was at least partly engendered by reliance on money creation for financing the deficit led to overvaluation of the official exchange rate, given the fixed nominal rate. This overvaluation, not only affected Ghana's trade performance, but increased the premium on parallel market activity (defined as the black market exchange rate over the official exchange rate) and lead to increased activity in the parallel markets. May (1985) estimated that parallel market activity reached 32.41 percent of the official market GDP in 1982.[35] Increased black market activity resulting from inflation also eroded the tax base (particularly from cocoa)

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[35] See Azam and Besley (1989), May (1985) and Pinto (1987) for discussions of parallel markets in Ghana. The effect of fiscal deficits on the official and parallel exchange rate is discussed in the companion paper by Ms. Islam.

as normally taxable activities slipped into the parallel market (recall from part II the dramatic decline in cocoa export duties in the early eighties). To the extent that this loss in revenue implies increased deficits that are financed via inflationary means, the cycle could be never-ending. With the onset of the structural adjustment program, however, the government devalued the cedi and has progressively deregulated exchange markets so that inflation is no longer necessarily translated into higher black market premiums.

Finally, high inflation resulting in part from money creation contributed to the erosion of the tax base. Overvaluation of the currency led to reduced exports, an important source of revenue in Ghana. Reduced exports implied less foreign exchange for the financing of imports and hence, a reduction of revenue from import duties. Lower economic activity resulting from lack of imported inputs also implied lower sales and excise taxes.

To sum up, prior to 1984 Ghana was constrained to finance her fiscal deficits domestically. For the most part, the deficits were financed by money creation. This was particularly the case in 1977 and 1978. Extensive reliance on this method of finance implied an increase in the money supply and a sizable increase in the rate of inflation. After this period the effects of domestic financing on inflation become less clear but still seem to contribute to high inflation rates up until 1984. In this year the government substituted

external finance for domestic finance, and to the extent that the increase in net foreign assets was monetized it also has had inflationary consequences. In the heavily controlled Ghanaian economy, the resulting inflation made real interest rates negative thus inhibiting financial intermediation. It also led to overvaluation of the currency and an increase in the black market premium. Both negative real interest rates and the overvalued currency contributed to increased incentives to operate in the parallel markets.

2) Inflation, the Demand for Assets, and Seignorage

This section considers how inflation in Ghana affects the demand for both money and quasi-money and in turn, how these demands affect seignorage revenues. A simple model is used to consider the effect on seignorage revenue of a lower rate of inflation. We also consider the effect that the expropriation of currency during 1979 (and in later years) may have had on money demand and in turn on seignorage revenue

a) The model

The model used is a simple version of that proposed in Appendix II of Easterly et al (1989) and is based on the "public finance approach to inflation" literature discussed above. The basic equation of the model is the budget identity:

$$(1) \quad DEF = EF + DC_g + L_g$$

This states that the government deficit must be equal to the sum of external finance (EF), domestic credit to the government (money creation), and domestic borrowing from the banking system.[36] External finance is assumed to be exogenous.

The specification of the portfolio demands of the private sector determine the private sector demand for currency and the allocation of their remaining assets between deposits and foreign currency:

(2) $M = f(\pi, i_d, Y)$

(3) $D = f(\pi, i_d, Y)$

Where π is the rate of inflation, i_d is the real interest rate on deposits and Y is income. The demand for foreign currency is determined as a residual.

Loans to the government is the residual after private credit needs have been met:

(4) $L_g = D(1 - \mu) - L_p,$

where L_p is credit to the private sector and is taken as given.

---

[36] For simplicity we have assumed that domestic and external interest payments are zero.

Domestic credit to the government is determined as high powered money (H) minus net foreign assets (EF^*) plus any additional net liabilities (NOL):

$$(5) \quad DC_g = H - EF^* - NOL,$$

High powered money is equal to reserves on deposits and currency:

$$(6) \quad H = \mu D + (c + \mu(1-c))M,$$

where μ is the reserve ratio on deposits, D is deposits, c is the currency/M1 ratio and M is M1.

The above relationships are used to determine equilibrium in the market for domestic debt and in the market for high powered money. Both are functions of the rate of inflation:

$$(7) \quad L_g = f(\pi) \qquad f_1 < 0$$

$$(8) \quad H = g(\pi) \qquad g_1 > 0$$

In equation (7), the market for domestic debt will be negatively related to the inflation rate because inflation depresses deposits and thus for a given level of private credit, reduces the amount available of credit to the government. The equilibrium equation for the money market

implies that the deficit financeable through money creation will be a positive function of inflation as long as the maximum point of the Laffer curve has not been passed.

Using this framework, we specify the demand for money and quasi-money and, given the rate of inflation, solve for seignorage revenue. Before considering some alternative scenarios, consider the demand equations for M1 and quasi-money.

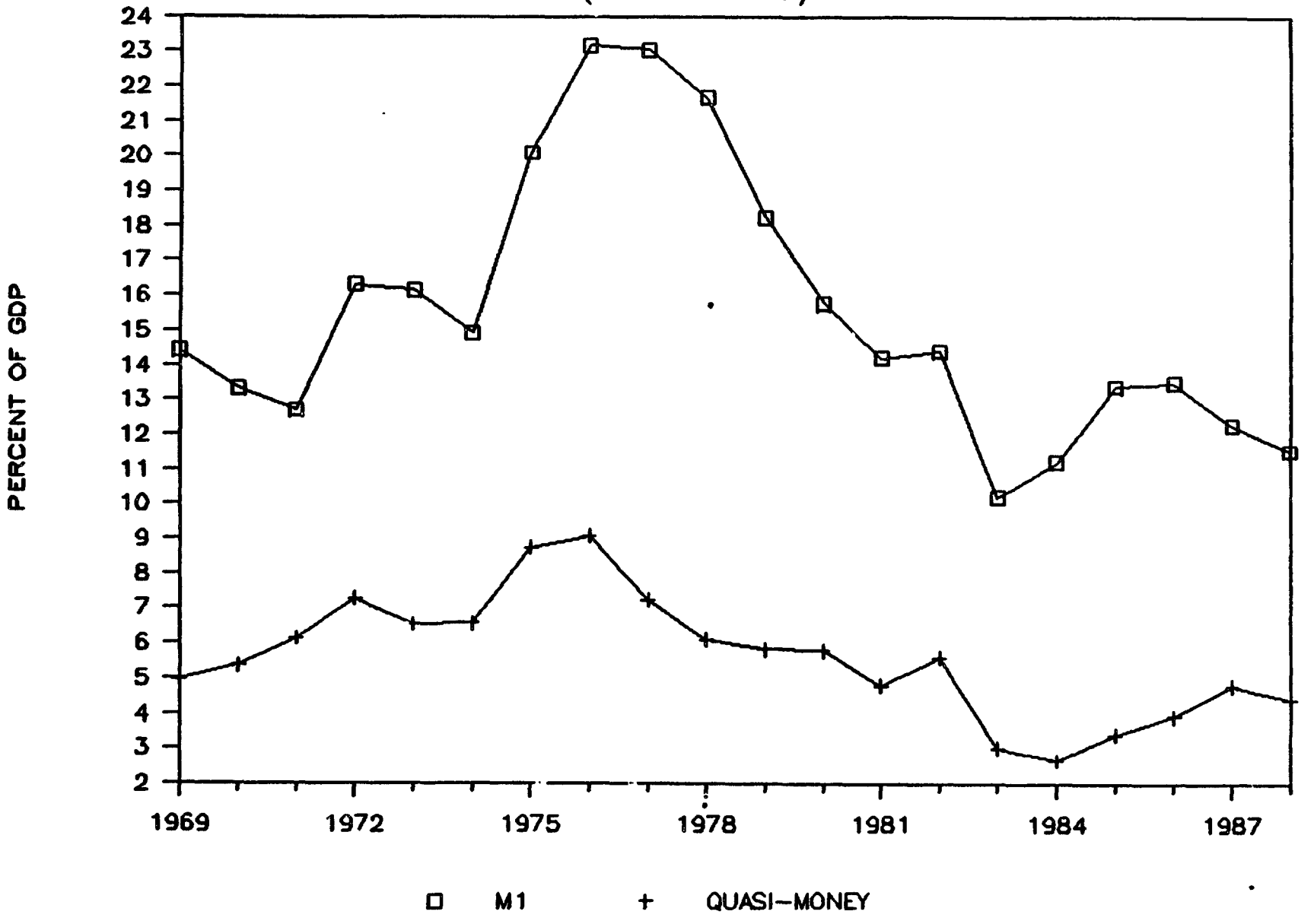
b) The Demand for Money and Quasi-money

Figure 3.3 shows M1 and quasi-money as a percent of GDP. M1 as a share of GDP ranges from between 11 and 23 percent of GDP. Demand for M1 peaks in 1976 and 1977 and drops off sharply after 1978. We might expect that the high levels of inflation of 1977 and 1978 led to a decline in the demand for currency. The currency conversion of 1979 might also have affected demand for M1. We also see a sharp drop in demand for M1 in 1982 which may be the result of several measures taken in the early eighties including demonetization of the 50 cedi note in 1982, the freezing of bank deposits in excess of 50,000 cedis pending investigation for tax liability, the recall of bank loans for the financing of trade inventories, and the requirement that business transactions in excess of 1,000 cedis be conducted by checks. Such actions are likely to have prompted movement into foreign and informal asset

FIGURE 3.3

M1 AND QUASI-MONEY

(PERCENT OF GDP)



markets.

Figure 3.3 also shows quasi-money as a percent of GDP. The demand for quasi-money to GDP follows a similar pattern to M1, declining from 9 percent of GDP in 1976 to about 3 percent in 1984. It is also likely to have been affected by the measures discussed above.

The basic equation we use to estimate money demand is as follows[37]:

$$M_t = \alpha_0 + \alpha_1 \pi_t + \alpha_2 Y_t + \alpha_3 r_t + \mu \qquad (1)$$

where M is equal to the log of real M1, π is equal to the inflation rate calculated from the GDP deflator, Y is equal to the log of real GDP, and r is the real deposit rate, all indexed to time t. The coefficients of π and r will be the semi-elasticities of real base money with respect to inflation and the real deposit rate, respectively. As inflation increases we would expect the demand for real money balances to decrease as private agents substitute into real goods or perhaps into foreign assets. We thus expect to find α_1 to be negative. We would also expect α_3 to be negative because as real deposit rates increase, private agents are likely to hold

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[37] There is a large literature on money demand and money demand equations. Because our interest is in the relationship between inflation and the demand for assets and interest rates and the demand for assets, rather than in the functioning of the monetary sector as a whole, we use very simple equations for our estimations.

less money and keep more in deposits. The coefficient on Y, α_2, represents the elasticity of money demand with respect to income. We would expect this to be positive because as income increases the demand for money balances rises.

The equation was estimated for the 1966-1988 period. The estimation indicated the presence of autocorrelation of the errors so a lagged dependent variable term was incorporated into the equation. The results of the estimation are as follows: (Figures in brackets below coefficient estimates are absolute values of the t-statistics.)

$$M = -3.02 + .846\ M1(-1) - .389\pi + .376Y - .248r, \quad R^2 = .80,$$
$$\qquad\qquad (.90) \quad (5.35) \qquad\qquad (1.84) \quad (1.34) \qquad (.654)$$

The errors are free of autocorrelation and normally distributed. Given the likelihood of collinearity between the inflation variable and the real interest rate variable, we re-estimated the equation without the real interest rate term. The results are:

$$M = -3.34 + .912\ M1(-1) - .269\pi + .328Y, \quad R^2 = .797$$
$$\qquad (.952) \quad (7.74) \qquad\qquad (2.63) \quad (1.23)$$

The signs of the coefficients are as expected. The coefficients on M1(-1) and π are significant at the five percent level whereas the coefficient on Y is not. An analysis of the residual correlogram indicated that the residuals are

not highly autocorrelated, so that inferences may be drawn from the above results.

The estimation indicates that the short-run semi-elasticity of M1 with respect to inflation is relatively low at -.269. The equation implies, however, a high long-run semi-elasticity of -2.99 indicating that inflation has a much stronger negative effect on money demand over time.

We re-estimated the money demand equation including dummy variables in order to account for the government's demonetization actions in 1979 and in 1982. Given that such events are not immediately forgotten, the dummy variables were set as zero to the given year and then to 1 thereafter. The results indicated that the dummy for 1982 was not at all significant and that for 1979 was significant, though not at a five percent level. The estimated equation is as follows:

$$M = -4.44 + .801\ M1(-1) - .155\pi + .527Y - .113DUM79,\ R^2 = .829$$
$$\qquad\qquad (1.39)\quad (6.27)\qquad\quad (1.35)\quad (1.93)\quad (1.79)$$

Y is now significant at a higher level whereas π is no longer as significant as in the previous equation. This is likely to be due to the fact that the equation has difficulty distinguishing between inflation and the dummy variable. The short run semi-elasticity of money demand with respect to inflation is lower than in the previous equation at -.155. The long-run semi-elasticity seems to be more reasonable as

well at -.75. Because of the more plausible nature of the long-run elasticity, the improved significance of GDP and because we would like to capture the effects of government actions on money demand, this last equation is the one we use in the simulation.

The demand for quasi-money was estimated based on the following equation:

$$QM_t = \beta_0 + \beta_1 QM_{t-1} + \beta_2 r_t + \beta_3 (r^* + e) + \beta_4 \pi_t + \beta_5 Y + \mu_t$$

where QM equals the log of real quasi-money, r equals the real deposit rate on 12 month deposits, r*+e equals the US real interest rate on Treasury bills adjusted for black market exchange rate depreciation, and π equals the GDP deflator inflation rate. The interpretations of the coefficients as semi-elasticities holds, but in contrast to the base money estimation, we expect that the coefficient on the real deposit rate will be positive and that the coefficient on the US interest rate will be negative. The expected sign on the inflation variable is less clear than in the previous estimation. An increase in inflation might encourage people to save more, but at the same time it might encourage substitution into real goods.

Neither of the interest rate variables in the above equation were found to be significant so they were dropped. The result is as follows (The absolute values of the t-

statistics are in parentheses.):

$$QM = -6.24 + .874\ QM(-1) - .582\pi + .605Y,\ R^2 = .9057$$
$$\quad (2.05)\quad (11.73)\qquad (6.35)\quad (2.46)$$

All variables are significant and of the expected sign. The short-run semi elasticity of money demand with respect to inflation is .582. Again, we find that the long-run semi-elasticity is very high at -4.47. The dummy variables were incorporated into the equation, but were not even close to being significant (t-statistics of about .6). As a result we have used the above equation in our simulation.

. . . .

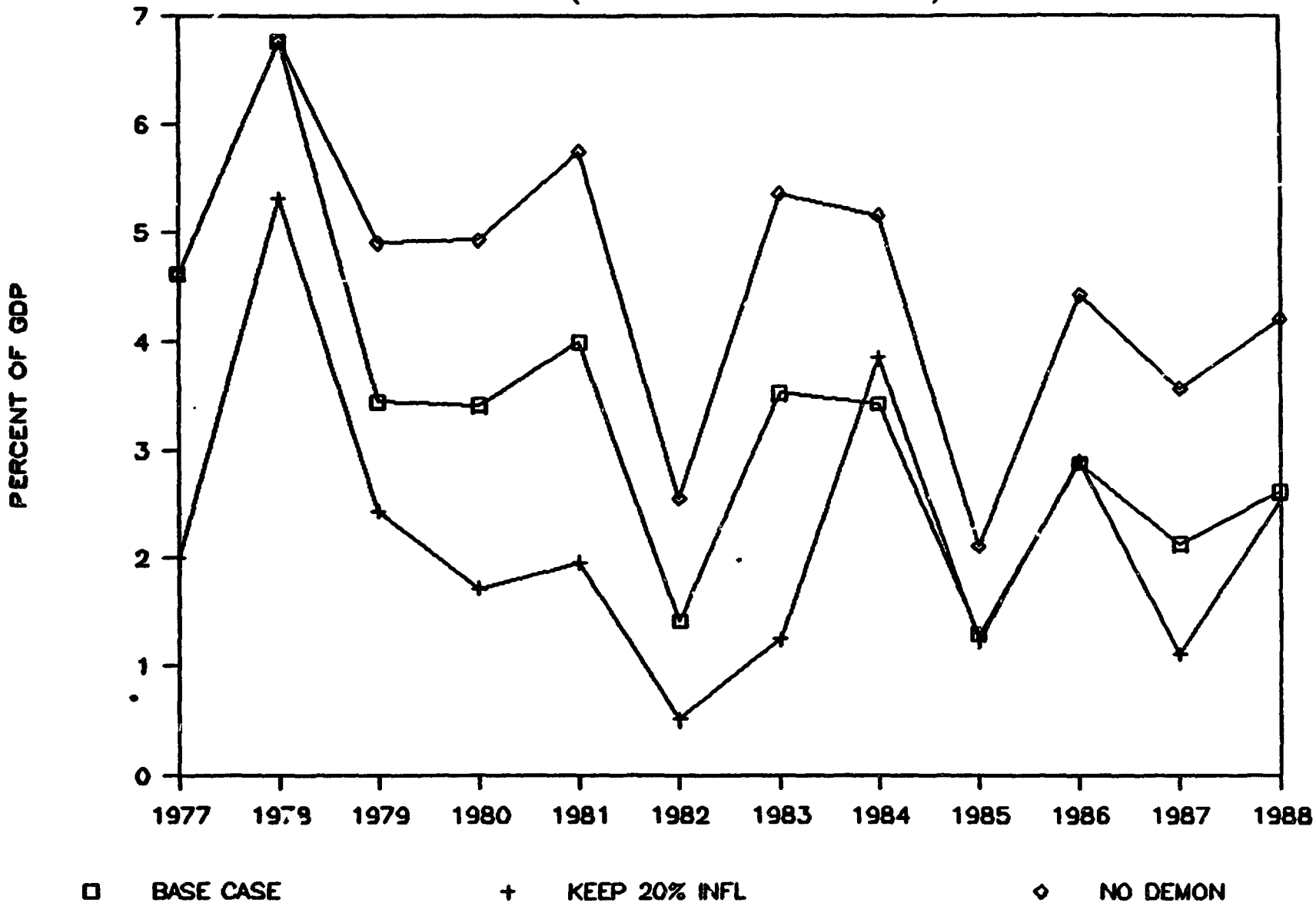
<u>c) Simulation results</u>

The demand for money and quasi-money equations discussed in the previous section were used in the model set out in section a) in order to consider the impact of inflation and government demonetization policies on seignorage revenue for the period from 1977-1988. We consider three scenarios which are set out in Figure 3.4: 1) the base case simulating government seignorage revenues given the actual rate of inflation[38], 2) the case in which the inflation rate is kept

[38] Note that we are using the inflation rate derived from the GDP deflator.

FIGURE 3.4

SEIGNORAGE REVENUE UNDER ALTERNATIVE SCENARIOS (INFLATION AND DEMONTZATION)



at 20 percent, and 3) the case in which the government did not pursue its currency appropriation policies during the currency conversion of 1979.

In the base case we see that seignorage revenue ranged from 4 to 6.5 percent of GDP in the beginning of the period to about three percent of GDP at the end of the period. Changes in seignorage respond to changes in inflation with a one period lag. For example, inflation based on the GDP deflator rose by almost 10 percent from 1977 to 1978, but seignorage revenue increased by a little over two percent over the same year. Seignorage then dropped about 3.5 percent in the next period although inflation was declining from 1978 to 1979. Over the period, we see a gradual decline in the amount of seignorage revenue to about 3 percent of GDP with two pronounced drops in seignorage revenue in 1982 and 1985. Despite high rates of inflation in the early eighties, seignorage revenue did not reach the levels that it had obtained during the mid-late seventies. The reflects the long-run effects of inflation (and government demonetization policies) on money demand. As high levels of inflation and uncertainty persisted, money demand declined and seignorage revenues remained at about three percent despite the increased rate of inflation.

This is illustrated by our second scenario in which the inflation rate is kept at 20 percent. Such a reduction in the inflation rate might be induced by reducing government

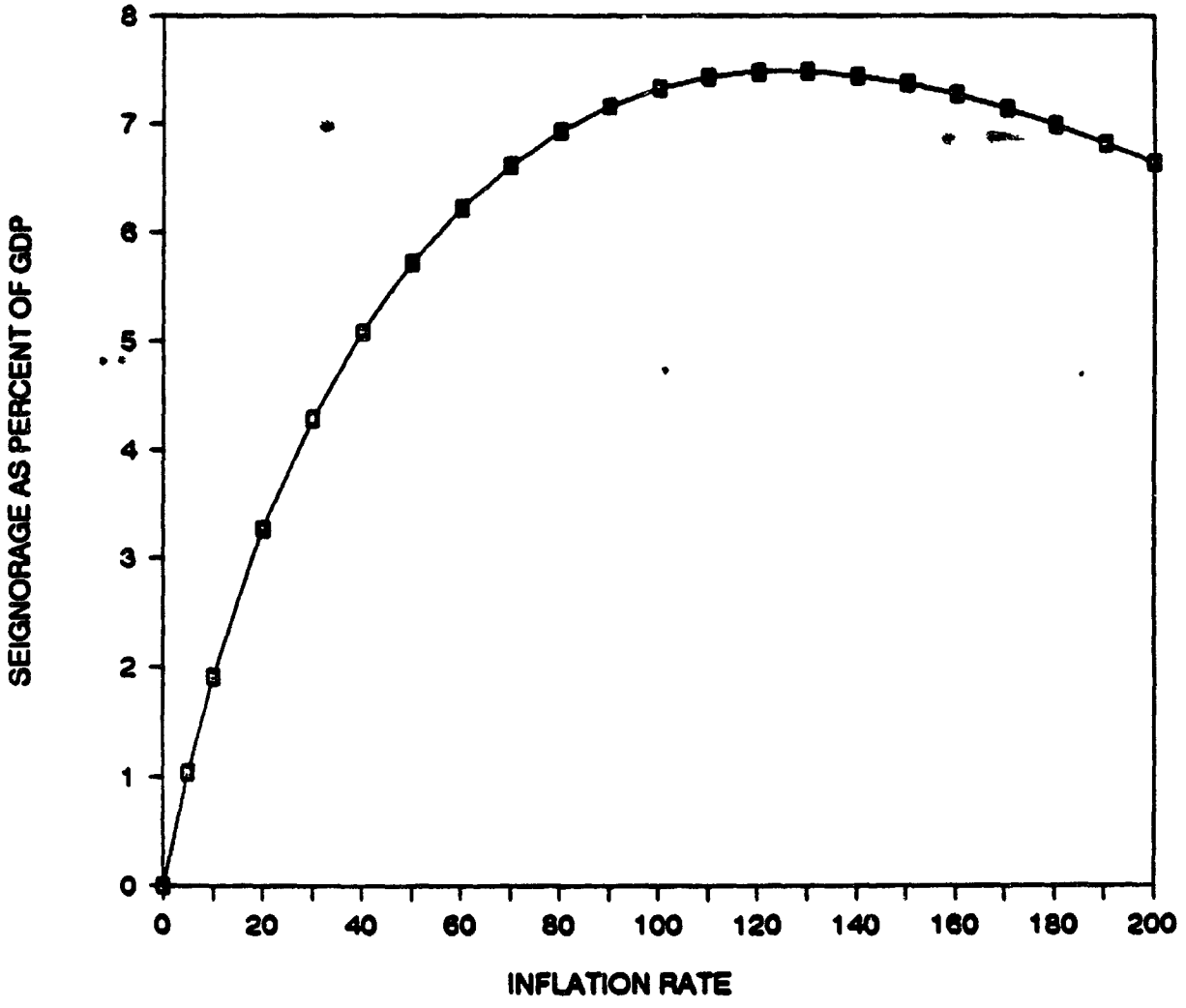
expenditures in order to lower the deficit that needs to be financed via money creation. Another possibility is that development of domestic financial markets or improvement in access to external finance might reduce the government's reliance on money creation as a source of finance.

We see from figure 3.4, that while seignorage revenue is lower when the inflation rate is kept at twenty percent, periods of high inflation do not provide proportionate increases in seignorage revenue. Seignorage revenue during the late seventies is only about 1.5 percent of GDP more than it would have been had the inflation rate been maintained at 20 percent. Moreover, the long-run effect on money demand results in little gain in seignorage in the 1980's. In 1984 we see that seignorage revenue at the inflation rate of twenty percent would have exceeded seignorage revenue at the actual inflation rate of about 40 percent. In the period after 1984, the gain in seignorage over that which would have been received with inflation at 20 percent is negligible. The accumulated effect of inflation on money demand contributed to reduced seignorage over time.

The disproportionate increase in seignorage revenue for increases the rate of inflation is confirmed by Figure 3.5. This figure sets out the seignorage revenue received for given inflation rates, based on our model. It shows a Laffer curve effect: that beyond a certain inflation rate (about 125 % for Ghana) seignorage as a function of GDP begins to decline.

FIGURE 3.5

SEIGNORAGE REVENUE



All of this highlights what is likely to have occurred in Ghana particularly during the seventies. Financing ever increasing deficits by money creation led to higher and higher rates of inflation that were not met with proportionate increases in seignorage[39]. This in turn led to even higher deficits which required even further reliance on money finance given the weakness of domestic financial markets, and the inability to obtain finance from abroad. Various measures were undertaken to try to reduce the rate of inflation including the appropriation of currency by the government during the currency conversion.

Our third scenario considers whether these actions, while perhaps reducing inflation in the short run, really led to higher inflation in the long run. Figure 3.4 gives an indication that had the government not undertaken such measures, seignorage revenues would have been higher throughout the period, therefore improving the government's fiscal position and lessening the need to resort to money finance. The increase in seignorage revenues would have been on the order of 1 to 2 percent of GDP. Data on how much demonetization took place is necessary to evaluate the tradeoff of gain vs. loss of the government's actions. It seems unlikely, however, that the one-off gain the reduction of inflation would offset the negative effect on seignorage

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[39] As well as to a reduction in other sources of revenue such as revenue from export taxes as discussed above.

revenues caused by the reduction in the demand for assets induced by such actions.

3.) Conclusion

The first part of this section showed us that prior to 1984, Ghana relied heavily on money creation in order to finance her deficit and that this contributed to inflation and negative real interest rates. The second part showed us that these high levels of inflation affected the demand for assets in Ghana which in turn affected the seignorage revenue that the government obtained. Increases in the rate of inflation did not have proportionate effects on seignorage revenue. Indeed, we found a Laffer curve effect where after a certain point an increase in the inflation rate caused a reduction in seignorage revenue. Demonetization by the government in an attempt to reduce inflation was shown to have reduced seignorage revenues on the order of 1 to 2 percent. In the longer run, the increase in money financing necessary to compensate the loss in seignorage revenues is likely to offset the one-off gains in reduced inflation brought about by the demonetization.

IV.) FISCAL DEFICITS AND PRIVATE CONSUMPTION AND PRIVATE INVESTMENT

This section will focus on the effects of fiscal deficits on the real side of the economy. In particular, it will focus on the ways in which the fiscal deficit affects private sector consumption and investment.

Figure 4.1 shows private consumption and private investment as a share of GDP from 1969/70 to 1988. We see that in general private consumption constitutes a large portion of GDP. At the beginning of the period private consumption stood at roughly 75 percent of GDP. It rose steadily until 1983 when it reached 91 percent of GDP. Such a trend reflects the deterioration in the economic climate in Ghana over the period. As conditions worsened more and more effort went into subsistence and providing for the present than into investment for the future. After 1984, private consumption levels fell somewhat but remained well above the 1969/70 level.

The low level of private investment in Ghana is immediately obvious from Table 4.1 and Figure 4.2. Private investment as a share of GDP stood at just under 12 percent of GDP in 1969/70. It fell over the next three years, but rose again in the period between 1972/73 and 1974/75. From 1974/75 until 1982, private investment fell reaching a low of 2.3 percent of GDP in 1982. It has fluctuated since then, reaching 4.4 percent of GDP in 1988.

In the following pages we investigate how fiscal deficits

FIGURE 4.1

PRIVATE CONSUMPTION AND INVESTMENT

1969/70–1988

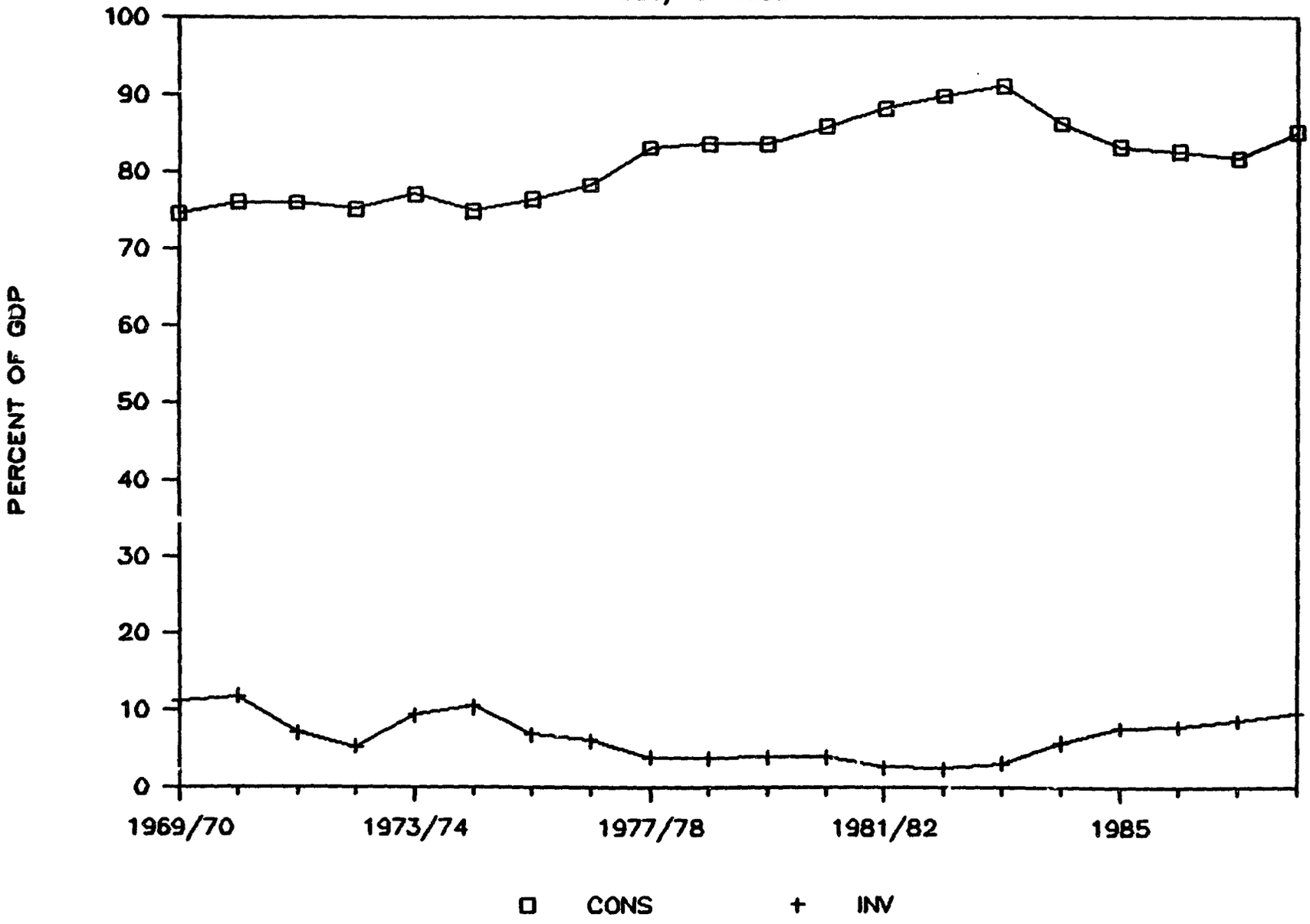


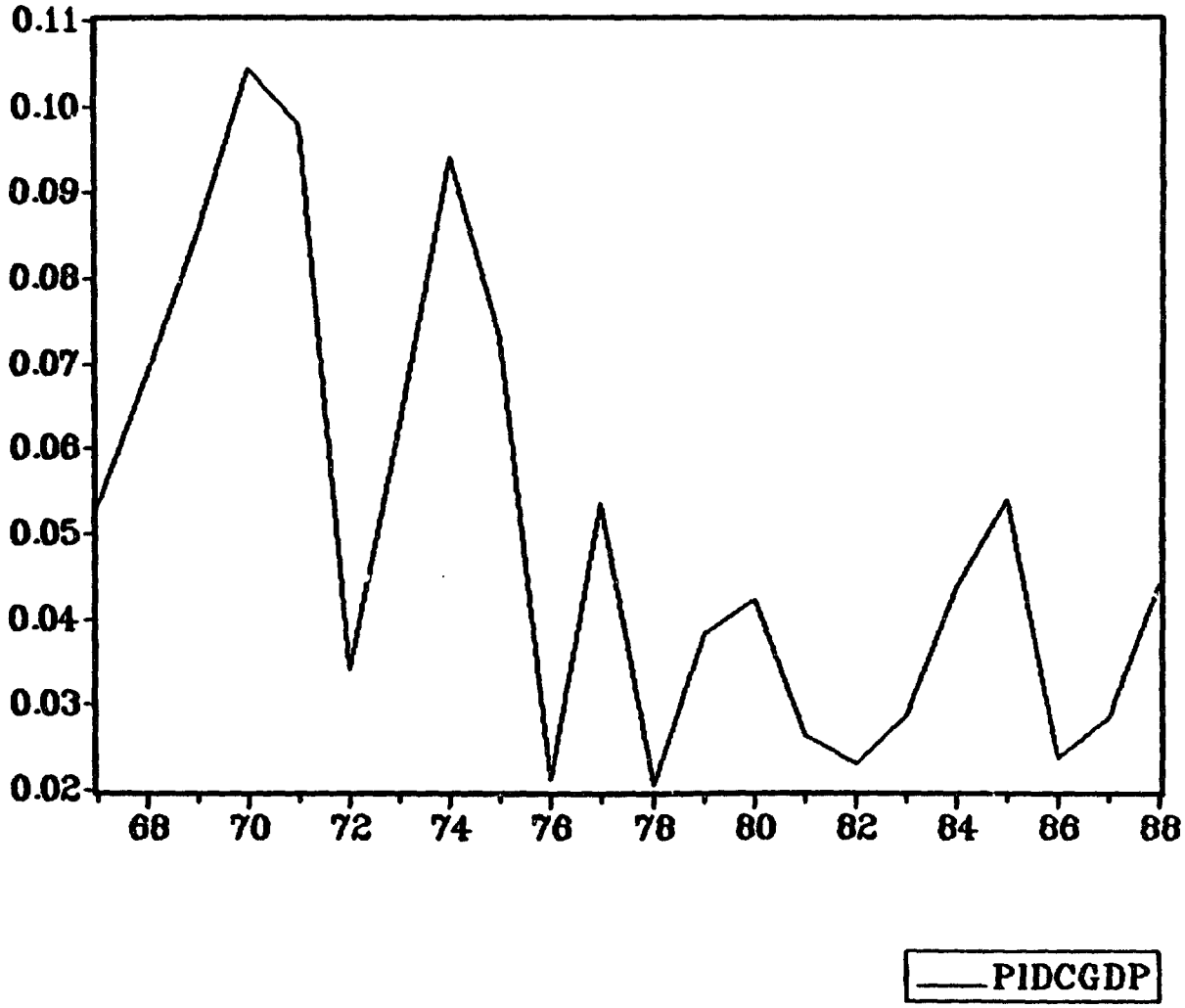
Table 4.1

year	private investment as a proportion of GDP
1967	0.05325
1968	0.06870
1969	0.08542
1970	0.10432
1971	0.09796
1972	0.03410
1973	0.06282
1974	0.09421
1975	0.07312
1976	0.02127
1977	0.05358
1978	0.02063
1979	0.03845
1980	0.04235
1981	0.02659
1982	0.02305
1983	0.02880
1984	0.04395
1985	0.05411
1986	0.02383
1987	0.02852
1988	0.04423

Source:Quarterly Digest of Statistics, Ghana, and various World Bank Reports.

Figure 4.2

Real private investment as a proportion of GDP 1967–1988



have affected these patterns of private consumption and investment. We will consider first the relationship between fiscal deficits and consumption followed by that between fiscal deficits and investment.

1.) Fiscal Deficits and Consumption

There has been a great deal of theoretical debate over the years concerning the effect of fiscal deficits on private consumption. The Keynesian tradition holds that current consumption is determined by current disposable income e.g. present income minus taxes. The permanent income hypothesis suggests that current consumption is determined by the present value of future income which implies that both present and future tax levels will affect current consumption. More recently the debate has focused on the validity of the Ricardian equivalence approach which argues that, under certain conditions, private consumption determination will not be affected by the way in which the government chooses to finance its deficit. In other words, taking public expenditure as given, private consumption will not be affected by fiscal deficits.

The distinction between the first two arguments and the last is of considerable importance to policy-makers. If Ricardian equivalence holds, then reductions on fiscal deficits will not affect the level of consumption in the economy and the basis for deficit reduction as part of stabilization programs no

longer exists. In this case, policies and programs to reduce fiscal deficits may be completely misdirected. However, the conditions necessary for Ricardian equivalence to hold are very strict. They include the following: no liquidity constraints; household's planning horizons must be infinite; the rate of discount applied to future income by consumers must be equal to the rate at which the public sector can borrow; and consumers must act rationally in forming expectations of future tax liabilities. Given these conditions, particularly that concerning liquidity constraints, we would not expect to find evidence of Ricardian equivalence in Ghana where credit to the private sector is highly regulated.

While most of the empirical work on Ricardian equivalence concerns developed countries (the early literature tended to support Ricardian equivalence whereas much of it now rejects it), there have recently been a few studies that have focused on Ricardian equivalence in developing countries.

Haque and Montiel (1987) test for the empirical relevance of Ricardian equivalence in sixteen developing countries by considering whether the liquidity constraint condition and the Yaari-Blanchard condition[40] hold. The empirical estimates derived in their paper suggest that full Ricardian Equivalence can be rejected in 15 of the sixteen countries in the sample. Their model found evidence that the prevalence of liquidity

[40] This is the condition that private and public discount rates are equivalent. This may not hold if the government and the private sector have different planning horizons. See Blanchard (1985).

constraints in a large number of developing countries is the principal reason for rejecting Ricardian equivalence. No evidence was found in support of the Yaari-Blanchard effect.

Leiderman and Razin (1988) test for Ricardian equivalence in Israel. Their framework considered two channels which might cause deviations from Ricardian equivalence: the finite horizons/Yaari-Blanchard effect and liquidity constraints. Their estimation found that the restrictions imposed by the Ricardian equivalence hypothesis could not be rejected. Expansion of their model to allow for public goods consumption did not alter these results.

Haque (1988) focused on the Yaari-Blanchard proposition of finite horizons for consumer planning problems as the source of deviation from Ricardian equivalence. The results of his tests found evidence in favor of the infinitely-lived households in 15 out of the 16 countries tested. Finally, Rossi (1989) develops an approach that emphasizes real interest rates and liquidity constraints in the determination of consumer behavior. He uses pooled data of geographical regions and finds strong evidence that where liquidity constraints are substantial they do have an important effect on consumer behavior and imply that Ricardian equivalence does not hold.

In sum, the evidence for developing countries (with the exception of Leiderman and Razin) indicates that Ricardian equivalence does not hold and that the existence of fiscal deficits and their financing will have economic effects.

Our first attempts at estimating the consumption function followed the research proposal quite closely, variables on public tax and expenditure composition. Given the generally poor nature of Ghanaian data and the high probability that significant collinearity exists among some of the fiscal variables discussed, we decided to abandon the numerous variables suggested in the project proposal and to opt for a much simpler estimation. The equation estimated i.

$$C_t = \alpha_0 + \alpha_1 Yp_t + \alpha_2 rh_t + \alpha_3 LC_t + \alpha_4 FISCDEF_t + \mu,$$

where C_t is current private consumption, Yp_t is current disposable income as described above, LC_t credit to the private sector and $FISCDEF_t$ is the conventional measure of the fiscal deficit as discussed in part II. All variables are as in percent of GDP.

Ideally one would use a measure of labor income to determine permanent income, however, no data on labor income are available for Ghana. Following Haque and Montiel (1987) we use GNP minus taxes as our measure of disposable/permanent income.

Dornbusch (1983) makes a case for using the "home" real interest rate or the "consumption-based" real interest rate. He argues that the presence of a home goods (nontradable) sector implies that the relevant real interest rate appropriate to consumption decisions depends on the rate of change of the real price of home goods. This "consumption-based" real interest rate

is thus the rate used in our consumption regression. It is calculated according to the following definition (from Dornbusch):

$r^h = (1 + r^*)(P_t/P_{t+1})^{1-a}$, where r* is the world real interest rate (we used the U.S. rate), P_t is the relative price of home goods in terms of traded goods, and 1-a is the share of home goods (nontradables) in consumption.

The domestic credit to the private sector (from IFS) is used as a proxy for liquidity constraints. The measurement of liquidity constraints in Ghana poses particular difficulties because there is an extensive network of informal credit arrangements that do not appear in any of the official statistics. The measure used may therefore not completely capture the effective liquidity constraint, but it seems to be the best available proxy.

The measure of the fiscal deficit used is the conventional measure as discussed in Part II.

In the estimation of this equation there was evidence of autocorrelation so a lagged dependent variable was added to the equation. The estimation of this second equation found only lagged consumption and disposable income to be significant. The interest variable, the private credit variable and the fiscal deficit variable were all found to be insignificant. The results of the final estimation are as follows: (absolute values of t-statistics are in parentheses)

$$C = .04999 + .6668\ C(-1) + .3152\ Yp, \qquad R^2 = 86.13$$
$$\quad (.005) \quad (5.24) \qquad\quad (2.24)$$

Neither pure Ricardian equivalence (in which case the coefficient of Yp would not be significantly different from zero) nor the pure Keynesian theory hold. The significance of Yp indicates that some consumers are liquidity constrained which we expect to find in Ghana.

Our equation unfortunately does not allow us to say anything about the effects of the fiscal deficits on consumption. Public expenditure and public revenue variables were incorporated into other estimations, but neither was significant. Further research on the interaction between fiscal deficits and private consumption is therefore needed.

2.) Fiscal Deficits and Private Investment

The issue of private investment in Ghana is a particularly important one at present when it has become clear that to sustain high growth rates while simultaneously reducing government involvement in the economy would require a substantial increase in private investment.

The fiscal deficit is expected to affect private sector investment in a number of ways. Firstly, higher public sector expenditure financed by public sector borrowing can crowd out private sector investment. There are two channels by which this can happen: (i) if higher public sector borrowing raises the

real interest rate then this may lower private investment by raising the user costs of capital and (ii) if there are direct credit controls, then higher credit to the government may mean fewer funds available for the government. The main problem in Ghana has been access to credit for a large number of potential investors; this means that investment has to be financed by retained earnings and net profits therefore play an important role. The interest rate however, has been controlled in Ghana: nominal interest rate ceilings accompanied by high rates of inflation have led to negative real interest rates. Table 4.2 shows the real interest rate and the rate of inflation from 1965 to 1988.[41]

Public sector investment may have an additional effect on private investment depending on whether or not it is a substitute for or complement to public investment. If the government (or government entities) invest in areas that the private sector would invest in anyway or if they undertake investment activities that would make private investment activities unprofitable then higher public investment would tend to lower private investment. On the other hand, if public investment consists of activities that raise the profitability of private investment (for instance investment in certain kinds of infrastructure) and which the private sector itself does not find profitable to engage in then higher public investment may

[41]We have calculated the rate of inflation using the consumer price index.

Table 42

Year	real interest rate	rate of inflation
1967	13.611	-8.4597
1968	-3.6098	7.8947
1969	-3.0909	7.3171
1970	0.94147	3.0300
1971	-2.7919	9.5588
1972	-3.2409	10.067
1973	10.565	17.683
1974	-10.907	18.135
1975	-17.003	29.825
1976	-30.966	56.081
1977	-50.219	116.45
1978	-35.298	73.100
1979	-27.470	54.419
1980	-25.380	50.093
1981	-45.263	116.49
1982	-10.463	22.296
1983	-49.299	122.87
1984	-16.372	39.665
1985	6.7943	10.306
1986	-3.8253	24.565
1987	-12.170	39.815
1988	-8.9521	31.359

Source: International Financial Statistics and Quarterly Digest of Statistics, Bank of Ghana.

raise private investment.

Other factors that are expected to be significant in determining private investment levels, are corporate tax rates, investment subsidies, and the general investment climate (uncertainty regarding future economic policy, etc.) all of which determine the overall profitability of investment. While the general investment climate in Ghana has not been particularly encouraging in the past, uncertainty regarding the profitability of investing does not seem to be a problem : agents are willing to invest more given the current economic environment but are constrained by other factors (access to credit).

The investment equation that we have estimated for Ghana seems to confirm what we would expect from our analysis of Ghana's economy. The variables in equation (A) are defined as follows:

PIDCGDP = the level of private investment in real terms as a ratio of gross domestic product.

PBICDGD = the level of public investment in real terms as a ratio of gross domestic product.

CPTCDGD = corporate tax revenues collected by the government in real terms as a ratio of gross domestic product.

Equation a

LS // Dependent Variable is PIDCGDP
Date: 7-09-1990 / Time: 17:40
SMPL range: 1967 - 1988
Number of observations: 22

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	-0.0022513	0.0234236	-0.0961106	0.925
PBICDGD	-1.1020574	0.3991700	-2.7608725	0.014
DV76	-0.0397535	0.0234011	-1.6987847	0.109
CDCDGDP	0.5569441	0.2297309	2.4243324	0.028
RINT3	-0.0001237	0.0003814	-0.3241632	0.750
CPTCDGD	3.9736432	1.7436781	2.2788858	0.037

R-squared	0.561419	Mean of dependent var	0.051058
Adjusted R-squared	0.424362	S.D. of dependent var	0.026364
S.E. of regression	0.020003	Sum of squared resid	0.006402
Durbin-Watson stat	2.041154	F-statistic	4.096258
Log likelihood	58.34770		

CDCDGDP = credit to the private sector in real terms as a ratio of gross domestic product.

RINT2 = the real rate of interest.[42]

DV76 = a dummy variable for 1976.

The flow of credit to the private sector was used as a proxy for liquidity constraints faced by investors with the assumption that the higher the flow of credit to the private sector the less investors will be liquidity constrained and thus the higher will be the level of investment. A dummy variable has been included for 1976 since there was a large and unexplained drop in private investment in this year.

We find public investment, corporate tax revenues, and the liquidity constraint variable to be statistically significant. We see that public investment affects private investment negatively and there seems to be a one for one effect. This seems to indicate that public sector investment in Ghana has mostly substituted for private investment. This result is not surprising since in fact, the government plays a large role in the economy, and traditionally has not encouraged private investment, emphasizing, the government's role in many

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[42]The real rate of interest was approximated by the relationship $r = (((1+i)/(1+\pi))-1)*100$ where r is the real interest rate, i is the nominal interest rate and π is the rate of inflation calculated using the CPI.

activities that could be performed by the private sector. This suggests that if public sector involvement were to be reduced in Ghana or perhaps the nature of public sector investment were to change (with the government focusing on activities complementary to private investment) we would see an increase in private investment. Therefore, the current program stressing the divestiture of state owned enterprises could lead to an increase in private investment by substituting private for public investors and also by indicating to the private sector that the government wishes to actively encourage investment.[43]

We would expect an increase in corporate tax rates to have a negative effect on private investment. Using corporate tax revenues collected by the government as an indicator of the tax burden faced by firms we find that it has a positive sign. This may be because the level of revenues collected by the government is highly correlated with the profits of firms or with firms income and growth. The higher the profits made by investors the higher will be the taxes paid at any given corporate tax rate. Thus our corporate tax revenue variable is probably picking up the effect of higher profits on investment which, of course, is positive. Unfortunately we do not have separate figures for corporate profits and cannot isolate the effect of profits on investment. Note that corporate profits have a particularly

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[43]The actual effects may be smaller than expected since a great deal of funding for public investment comes from abroad -- if the private sector has no access to funds then investment will not rise.

important role in Ghana given that firms are liquidity constrained and cannot borrow as much as they would like to.

The flow of credit to the private sector has a positive coefficient as expected. This result tells us that one way to enable higher levels of private investment in Ghana would be to ease the supply constraint on credit to investors: as long as firms are liquidity constrained at the going interest rate, there will be excess demand for credit and therefore excess investment demand.

The real interest rate does not have a substantial effect on private investment. Nominal interest rates in Ghana have been strictly controlled and the real rate of interest derived from the inflation adjusted nominal interest rate is negative almost all throughout the period of analysis. With negative real interest rates there will be an excess demand for credit as long as returns to investment are positive and the supply of credit will be the factor determining investment demand.

Using equation (A) we ran some simulations to see what the effect of varying the supply of credit to the private sector, and of reducing public sector investment would be on private investment levels. Table 4.3 shows the actual ratios of public sector investment to gross domestic product, of private sector credit to gross domestic product and private sector investment to gross domestic product. Table 4.4 shows actual private sector investment to GDP ratios and two simulations: in one case we keep public sector investment (in real terms) at one percent

Table 4.3

obs	PBICDGD	PIDCGDP	CPTCDGD	CDCDGDP	RINT3
1967	0.049857	0.053247	0.020408	0.075650	13.61121
1968	0.042348	0.068698	0.018762	0.086578	-3.609759
1969	0.032489	0.085420	0.018618	0.092118	-3.090906
1970	0.037180	0.104324	0.016532	0.082503	0.941473
1971	0.043183	0.097961	0.015154	0.125790	-2.791925
1972	0.036945	0.034103	0.015879	0.100604	-3.240903
1973	0.027413	0.062821	0.016191	0.053418	-10.56482
1974	0.036266	0.094206	0.016727	0.056768	-10.90680
1975	0.054136	0.073121	0.019525	0.105658	-17.00336
1976	0.067576	0.021269	0.018158	0.110896	-30.96554
1977	0.057064	0.053579	0.011153	0.094733	-50.21929
1978	0.033117	0.020633	0.007052	0.070564	-35.29763
1979	0.026929	0.038445	0.008415	0.060904	-27.47029
1980	0.013885	0.042354	0.007934	0.047518	-25.37970
1981	0.019139	0.026588	0.006905	0.042040	-45.26316
1982	0.010723	0.023054	0.007681	0.047222	-10.46282
1983	0.008778	0.028801	0.004111	0.037650	-49.29880
1984	0.024819	0.043953	0.007843	0.047452	-16.37150
1985	0.041580	0.054115	0.013330	0.067873	6.794303
1986	0.072826	0.023832	0.018886	0.079724	-3.825312
1987	0.079422	0.028519	0.019277	0.075758	-12.16987
1988	0.080766	0.044228	0.026560	0.064668	-8.952145

Table 4.4

obs	PIDCGDP	INVSIM1	INVSIM2
1967	0.053247	0.097720	0.120915
1968	0.068698	0.108071	0.133429
1969	0.085420	0.110789	0.143591
1970	0.104324	0.103827	0.136735
1971	0.097961	0.117103	0.121091
1972	0.034103	0.106219	0.129912
1973	0.062821	0.079748	0.138100
1974	0.094206	0.083324	0.130640
1975	0.073121	0.118373	0.121397
1976	0.021269	0.081647	0.067839
1977	0.053579	0.081385	0.087049
1978	0.020633	0.055157	0.098565
1979	0.038445	0.055413	0.110358
1980	0.042354	0.046888	0.122510
1981	0.026588	0.039650	0.112625
1982	0.023054	0.047503	0.126595
1983	0.025801	0.027061	0.113195
1984	0.043953	0.048085	0.112275
1985	0.054115	0.088475	0.124415
1986	0.023832	0.107055	0.104035
1987	0.028519	0.104408	0.096543
1988	0.044228	0.124730	0.121252

of GDP (INVSIM1) and in another we raise private sector credit (INVSIM2) to twenty percent of GDP. We find that if we reduce public sector investment to one percent of gross domestic product, investment as a percentage of GDP would have been 12.5% rather than 4.4% in 1988! From 1978 to 1983 private investment as a proportion of GDP would still have been rather low but in most other years we would have seen a definite improvement.[44]

When we raise the supply of credit to the private sector and maintain it at 20% of GDP we find that investment would have been a much larger proportion of GDP in all years; in 1983, for instance, we would have had 12.1% rather than 2.9 percent of GDP accounted for by private investment. During 1977 to 1985 availability of credit seems to be the constraining factor; during these years even lowering public sector investment does not have a big effect on private sector investment.

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[44]During 1978 to 1983 the black market premium was very high and rising and the parallel market was flourishing. It is possible that during this period legal economic activities were diverted to the unofficial economy and the low investment ratios may not really be indicative of overall private investment activities in the economy.

V. FISCAL DEFICITS AND THE EXTERNAL SECTOR

This section of the study examines the implications of fiscal and exchange rate policies for the external sector in Ghana, in particular, the implications for the real exchange rate, the black market premium, and the trade balance. The exchange rate of Ghana's currency, the "New Cedi", which was created in 1967 was 'fixed' until April 1983; several devaluations have been used in the intervening 16 years to adjust the value of the New Cedis relative either to gold or to the US dollar. The fixed exchange rate system in conjunction with foreign exchange rationing and strict capital controls led to the development of a large black market in foreign exchange. The black market in foreign exchange has been affected considerably by the government's fiscal policies and reached sizeable proportions by the latter half of the sixties. Thus, any study of the public sector in Ghana must, for completeness, take into account the parallel market and related activities in Ghana. This section incorporates models of smuggling with the parallel market in foreign exchange and draws on models developed by Lizondo (1987), Pinto (1986) and May (1985).

Ghana's parallel market for foreign currency has been growing substantially since the mid 1960s with the increase in cocoa smuggling. In addition, the decline in export earnings during the late 70s and early 80s and the strict foreign exchange controls led to a large expansion of the black market

for foreign currency and to an intensification of export and import smuggling.[45] The evolution of the parallel market exchange rate from 1969 to 1987 is shown in Table 5.1 while Figures 5.1 and 5.2 show the average (PREM2) and end-of-period (PREMIUM) black market premium during the same period. The parallel market exchange rate, which represents the marginal cost of foreign exchange and which was at 8.96 cedis to the dollar in 1978 depreciated to 76.56 cedis/dollar by 1983 while the official rate remained at 2.75 cedis/dollar. Table 5.2 shows the volume of cocoa smuggled out of Ghana from 1960 to 1982 while Table 5.3 shows the growing demand for foreign exchange in the black market.[46] Estimates of the demand for currency in the black market show a steady increase during these years.

During the late 1970s and the early 80s, Ghana's fiscal deficits were financed by printing money. This led to high inflation rates during the same period with Ghana suffering triple digit inflation in 1977, 1981 and 1983. As can be seen in Table 5.4 the rate of inflation was around 116 during 1977 and 1981 and 122% during 1983. There have been two currency reforms, one in 1979 and one in 1982 in an attempt to deal with the effects of high inflation on currency values. In the first reform cash was exchanged at a rate of 70% for holdings of up to 5000 cedis and at a rate of 50% for holdings above 5000 cedis.

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[45]See, for instance Ernesto May (1984).

[46]These estimates are from May, ibid.

Table 5.1

Black market exchange rates

Year	Average black market premium	End-of-period black market premium
1969	1.6610	1.6065
1970	1.6993	1.6610
1971	1.4727	1.0000
1972	1.2569	1.2207
1973	1.2893	1.4992
1974	1.5009	1.3375
1975	1.7287	1.6696
1976	2.5270	3.7826
1977	8.0009	6.6870
1978	5.0777	3.6364
1979	5.6582	5.1964
1980	6.9102	4.0400
1981	9.5455	18.182
1982	9.8244	43.637
1983	8.6727	3.2330
1984	2.6862	2.0000
1985	2.4142	2.4172
1986	2.2420	2.2220
1987	1.7979	1.6438

Source: Pick's Currency Yearbook, various years.

Figure 5.1

The average black market premium

1969–1987

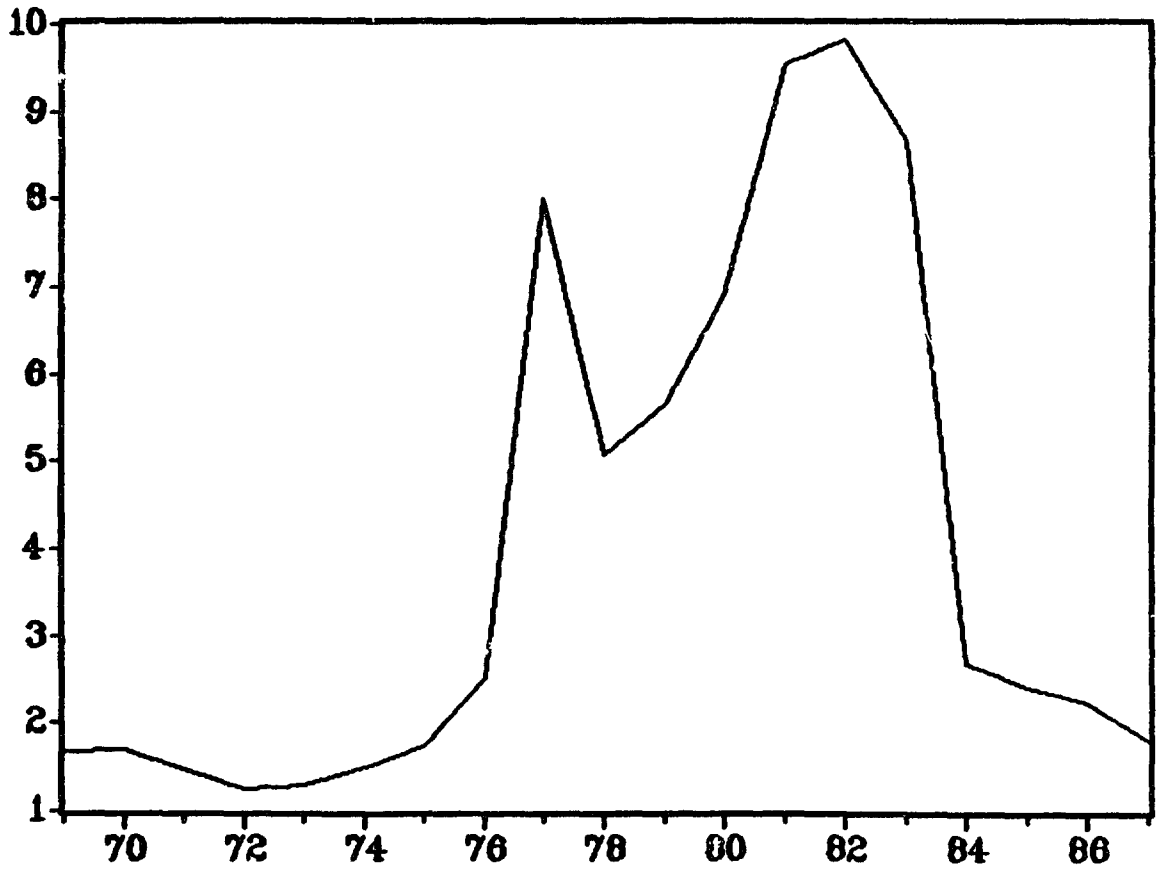

Figure 5.2

End-of-period black market premium
1968-1987

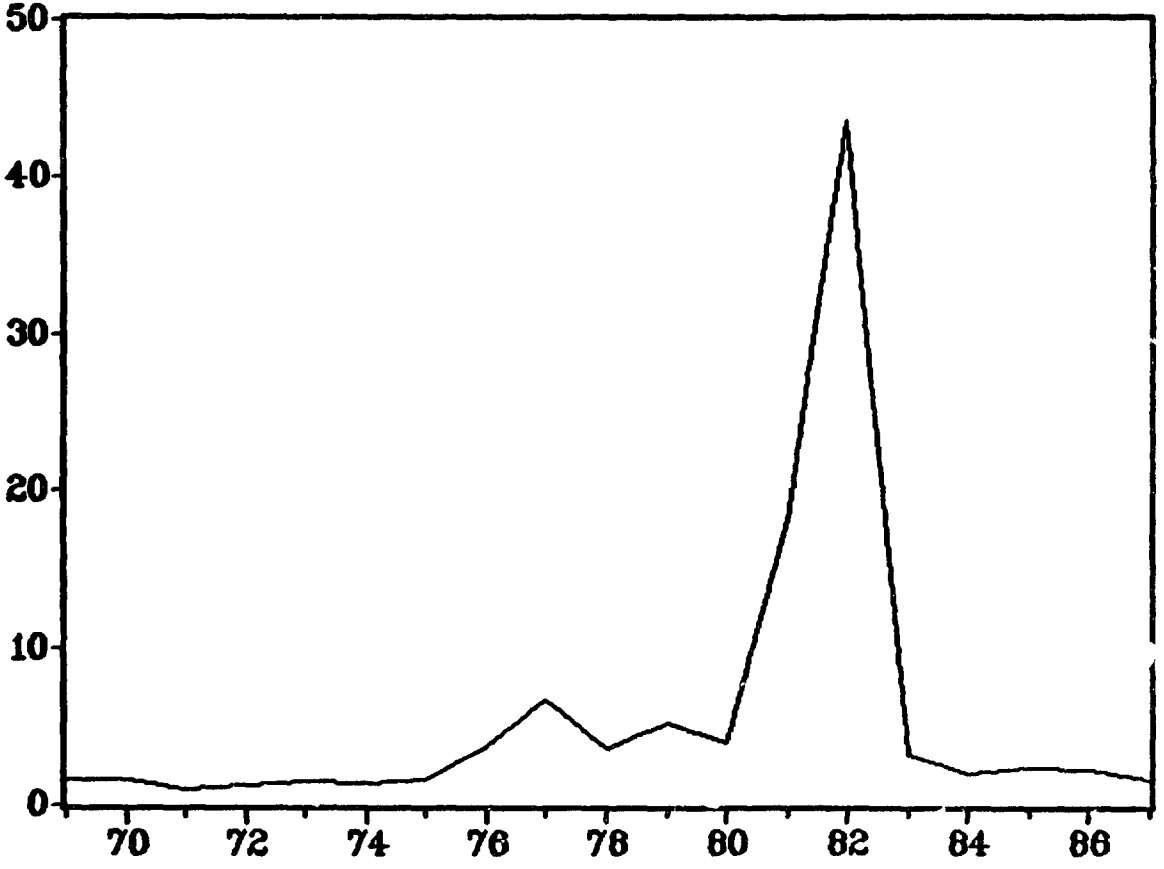

Table 2: Cocoa Smuggling and Production
1960-1979
(Thousands of metric tons)

Year	Production	Smuggled Cocoa
1960/61	430	10
1961/62	409	8
1962/63	413	14
1963/64	428	11
1964/65	538	14
1965/66	401	17
1966/67	368	17
1967/68	415	21
1968/69	323	17
1969/70	403	25
1970/71	413	31
1971/72	454	37
1972/73	407	42
1973/74	340	34
1974/75	376	30
1975/76	396	38
1976/77	320	40
1977/78	271	45
1978/79	265	50

Source: Ernesto May (1984)

Table 3: The Parallel Market Economy
(millions of cedis)

Year	Illegal Money	Parallel Market Economy	Parallel Market Economy as % of official GDP
1965	0.01	0.08	0.00
1966	1.66	9.71	0.64
1967	1.22	7.64	0.51
1968	0.87	5.71	0.34
1969	1.23	8.50	0.42
1970	0.96	7.15	0.32
1971	1.37	10.72	0.43
1972	1.27	7.73	0.27
1973	1.05	6.53	0.19
1974	3.65	24.54	0.53
1975	8.61	45.47	0.86
1976	15.74	72.68	1.11
1977	118.74	582.96	5.22
1978	282.71	1543.73	7.36
1979	483.15	3243.21	11.51
1980	1195.62	10024.37	24.45
1981	1313.16	12427.07	16.21
1982	2741.99	27827.27	32.41

Source: Ernesto May (1984).

Table 4

year	The rate of inflation
1969	7.1654
1970	3.0402
1971	9.5588
1972	10.067
1973	17.683
1974	18.135
1975	29.825
1976	56.081
1977	11[illegible].45
1978	73.100
1979	54.419
1980	50.093
1981	116.49
1982	2[illegible].296
1983	122.87
1984	39.665
1985	10.306
1986	24.565
1987	39.815
1988	31.359

Source: Derived from price index obtained from International Financial Statistics, various years.

The real money supply fell; currency in circulation also fell by 39% at the time of the reform. In 1982, the 50 cedi note was demonetized. During this period public confidence in the domestic banking system, and in the government declined.

During the last decade before the Economic Recovery Program was initiated, when the black market exchange rate was depreciating and the public sector deficit was rising, the official trade balance deteriorated from a surplus of $212.9 million in 1973 to a deficit of $60.6 million in 1983. The increase in government spending led to an increase in total domestic spending and was partly responsible for the worsening trade balance. Another important factor was the deterioration in Ghana's terms of trade which was 47% between 1973 and 1983. From August 1978 to April 1983 the cedi was pegged to the US dollar; as domestic inflation increased the Ghanaian currency became increasingly overvalued and the real exchange rate appreciated. The overvalued exchange rate combined with weak demand for Ghana's main export, cocoa, led to a dramatic decline in export earnings from $1066 million in 1979 to $439 million in 1983 and to a worsening of the trade balance even though imports fell in the same period from $780.3 million dollars to $499.7 million dollars.

Table 5.5 shows the trade and public sector deficits from 1970 to 1987. The public sector deficit reached a peak of US$ million 1277.82 in 1982, just before the Ghanaian authorities embarked on the Economic Recovery Program.

Table 5

year	trade surplus	fiscal deficit
1970	51.900	20.090
1971	-33.600	21.259
1972	161.40	74.247
1973	212.90	117.17
1974	-29.200	183.04
1975	150.40	490.87
1976	88.800	820.00
1977	29.400	1129.6
1978	112.50	1012.1
1979	262.60	674.55
1980	195.30	1097.1
1981	-243.60	1130.9
1982	18.300	1277.8
1983	-60.600	476.11
1984	32.900	40.960
1985	-36.300	119.19
1986	60.900	71.858
1987	-124.70	51.900

Source: International Financial Statistics, and various World Bank Reports.

In 1983, when the Ghanaian government adopted the Economic Recovery Program (ERP), the cedi was devalued from 2.75 cedis/dollar to 30 cedis/dollar and by 1986 to 90 cedis/dollar. There was a dual exchange rate system with some transactions covered under the fixed rate system and others by the exchange rate determined by the demand for and supply of foreign exchange at government managed auctions.[47] During 1983-86 exports grew 76.1 % in dollar terms and Ghana's foreign exchange earnings increased.[48] The trade balance improved, from a deficit of US $60.6 million to a surplus of US $71.9 million. At the same time the public sector deficit improved from a high level of US $476.1 million to US $71.9 million and the black market premium improved steadily. As shown in Figure 5.3, higher fiscal deficits had also been associated with higher black market premia. The black market real exchange rate depreciated during this period, as did the official real exchange rate since the lower domestic absorption (and therefore higher trade surplus) led to a decrease in the relative (domestic currency) price of tradables to home goods. The paths of the black market and official real exchange rates are shown in Figure 5.4.

This section of the study tries to explain the stylized facts presented above in the context of a model which takes into

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[47]This system was meant to reduce the spread between the official and parallel market rates, and actually achieved this.

[48]This increase in export earnings was due partly to an improvement in the terms of trade and partly to an increase in export volumes.

Figure 5.3

Scatter plot of the fiscal deficit against the black market premium--1970 - 1987

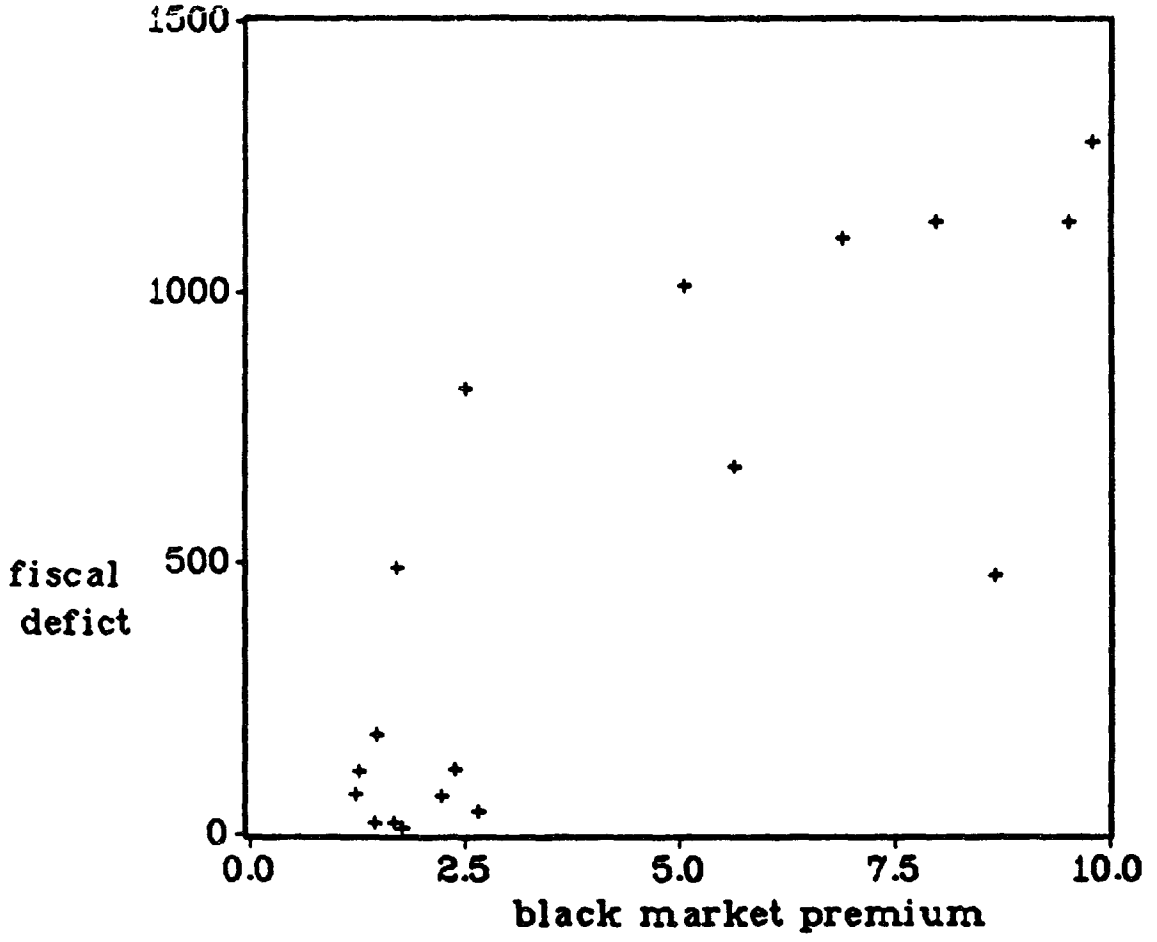
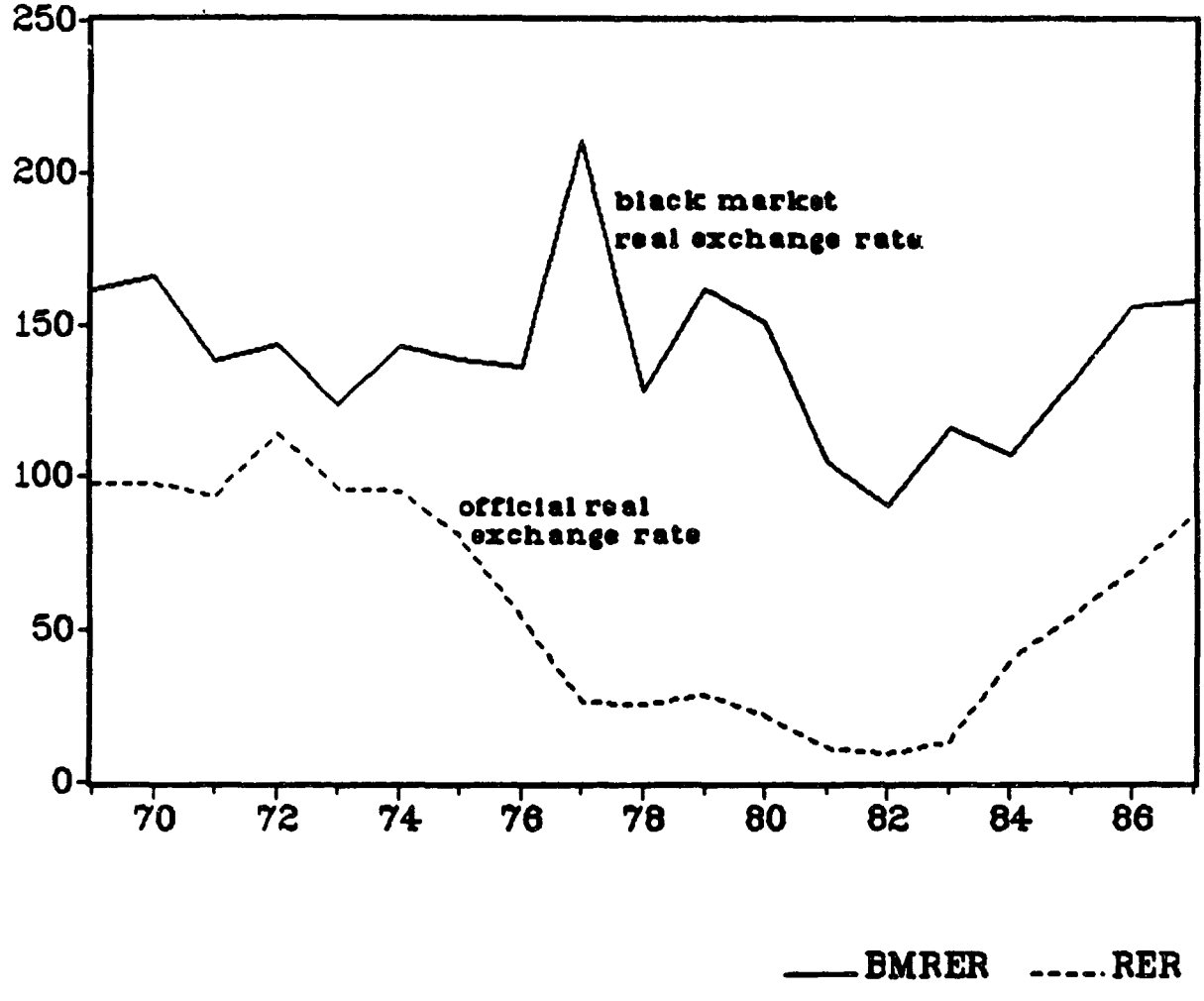


Figure 5.4

Official and black market real exchange rates 1969–1987



account the interrelationships between a government budget deficit financed by the inflation tax on domestic currency balances, the demand for foreign currency in both the official and black markets, and the resultant effects on the trade balance, and the real exchange rate.

Given that Ghana's public sector deficit was rising steadily up until 1983, and that the deficit was money-financed, the rate of inflation was also high. With an excess demand for foreign exchange at the prevailing official exchange rate, the black market premium increased. Higher domestic demand and rising domestic prices caused the real exchange rate to appreciate. The higher domestic demand also had a negative effect on the trade balance.

Several papers have attempted to explain the reason for the high black market premia prevailing in Ghana. Pinto (1985) looks at the interactions between high black market premia and inflation. His paper is based on the notion that a more stable foreign currency becomes a store of value in an environment with high and volatile inflation. When exchange markets are officially rationed this can lead to high premia in parallel foreign exchange markets. He provides an estimate for the inflation tax maximizing rate of inflation in Ghana and finds that the in the past the prevailing rates of inflation in Ghana were higher than this optimum or maximizing rate. A paper by Chhibber and Shafik (1988) looks at the inflationary consequences of exchange rate devaluation in the presence of

parallel markets for foreign currency.

May(1984) provides a theoretical framework to examine the way in which exchange controls and black markets for foreign exchange are related to lobbying for import licenses and to smuggling activities. He also develops a methodology based on a paper by Tanzi (1982), to assess the importance and magnitude of the parallel market economy in Ghana. He shows how the incentive to smuggle is related to the black market premium: smuggling will only occur if the import premium outweighs the black market premium.

Azam and Besley (1989) present a simple general equilibrium model determining both the parallel market exchange rate and the price of consumer goods, with particular application to Ghana.

The model developed in this section is based on paper's by Lizondo (1984) and Pinto (1988), on the relationship between the black market premium and government budget deficits. It also draws on May's (1984) analysis of black market premia and smuggling. The first part of this paper lays out the model focusing on exporters' and importers' maximization problems and the financing of the public sector budget. The second part of the paper solves for the determinants of the black market premium. The premium is found to depend on the levels of government expenditure and tax revenues among other things. From this analysis we derive an expression for the trade balance and for the real exchange rate in terms of the black market premium and therefore in terms of government expenditure and

revenues. The third part is an application of the theoretical analysis to Ghana. The fourth part concludes.

1.) The Model

In this paper, as in Pinto (1985) the government purchases foreign exchange from exporters at a fixed rate of e cedis/dollar and sells part of its foreign exchange to importers at rate e. The remainder of the foreign exchange is used to finance government consumption. With a black market foreign exchange rate of b cedis/dollar, the marginal cost of foreign exchange is b; note however, that the government obtains foreign exchange at rate e. Thus the official exchange rate, e, acts as a conduit for real income transfers between the government and the private sector. When the government is a net seller of foreign exchange then the black market premium acts as a source of revenue for the government. When the government is a net purchaser of foreign exchange then real income is transferred to the private sector from the government.[49]

The system of exchange rates above acts as an implicit tax on exporters who must sell foreign exchange earned from

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[49]However, the basic analysis in this section regarding the effects of higher government expenditure on the black market premium is valid regardless of whether the government is a net purchaser or seller of foreign exchange. This is because, in this model, an increase government expenditure given other sources of finance, must be financed by money creation. An increased stock of money will be held only at a higher premium regardless of whether the government is a net purchaser or seller of foreign exchange. However, the formal analysis is more complex in the net seller case.

exporting abroad to the government at less than its marginal cost. This implies that there is a conflict between the goals of encouraging exports and raising revenues to finance government expenditures. If the implicit tax on exports is lowered (the official exchange rate is devalued so that it equals the marginal cost of foreign exchange) then total exports will increase. The government is assumed to get revenues from the inflation tax as well as from conventional taxes and foreign aid. The inflation tax finances the residual requirements of the government net of the implicit tax on exports and net of conventional taxes and foreign aid.

In this formulation, an increase in public sector expenditure raises the reliance on the inflation tax. We assume that the inflation tax is given by πm where:

$$m = \frac{M}{e}$$

M = nominal money balances, and π = the rate of inflation. At the steady state the rate of inflation equals the official rate of depreciation of the currency. The government's budget constraint, at the steady state is shown in equation (1) below:

(1) $(g_T - t - A) = m\ \Delta e/e$,

where g_T = total government expenditure in dollars which is fixed and which equals $P_N\ g_N/e + g_I$

g_N = government expenditure on nontradables

P_N = the price of nontradables

g_I = government expenditure on importables

t = total government revenues in dollars which is also fixed

$g_T - t$ = the real fiscal deficit

$\Delta e/e$ = the official rate of depreciation

$g_T = \frac{g_N P_N}{e} + g_I, g_I = z\, g_T,\ z<1.$

A = aid flows to the government, in dollars.

Seignorage from the inflation tax is equal to $\Delta e/e\ m$, where $\Delta e/e$ is the official rate of depreciation and also the steady state rate of inflation. Given that the marginal cost of foreign exchange to the private sector is b and that the private sector's loss is the government's gain, we can write the above as:

(2) $g_T = M/b\ \Delta e/e + et/b + g(b-e)/b + eA/b$

$= m\ \Delta e/\phi + t/\phi + g(1-1/\phi) + A/\phi$ [50]

where ϕ = the black market premium

$et/b = t/\phi$ = the real tax burden to the private sector, and

$eA/b = A/\phi$ = the real value of aid flows to the private sector and similarly for the expressions involving government spending and the inflation tax. The expression $g_T(b-e)/b$ represents the implicit tax on exports.[51] The government sets e arbitrarily, and since it does not have reserves to deplete in maintaining this exchange rate the official exchange market is rationed by

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[50]See Pinto (1986).

[51]Pinto, ibid.

capital controls and restrictions on commercial transactions. As in Lizondo (1984) we assume that there is no official net foreign asset accumulation by the government so that $\dot{R} = 0$, where R = official reserves. The change in the stock of money is given by

$$(3)\quad M = \dot{R} + \dot{D}$$

where D = the change in domestic credit and M = the change in the nominal money supply.

a.) Production, Exports, and Imports

Agents in the economy produce two goods: exportables (X) and nontradables (N). Importables (I), are not produced domestically and are used only as inputs in the production of nontradables. The nontradable good is consumed by both the government and private agents. Exportables are not consumed domestically. Exportables and importables are traded on both official and unofficial (illegal) markets. Agents maximize the following:

$$(4)\quad P_N N + e\,P_x X_o + bP_x X_u - bC_1(X_u) - eI_o - bI_u - eR(I_o) - bC_2(I_u) - W(L_1+L_o+L_u)$$

subject to:

(a) $N = L_1^a\, I^{1-a}$

(b) $\bar{L} = L_1 + L_o + L_u$

(c) $I,\ L_i \geq 0$

(d) $X_i = L_i$

where

P_x = the world price of exports

P_I = the world price of imports which has been normalized to unity

P_N = price on nontraded goods

X = total exports

I = total imports

I_o = imports coming through official channels

X_o = exports going through official channels

$C_1(X_u)$ = cost of smuggling exports

$C_2(I_u)$ = cost of smuggling imports

$R(I_o)$ = cost of importing through official channels including rent-seeking

L_1 = labor employed in the production of the nontradable good.

L_o = labor employed in the production of exports going through official channels

L_u = labor employed in the production of exports going through illegal channels.

The cost functions have the following properties:

i) $C_1'(X_u)>0$ $\quad C_2'(I_u)>0$ ii) $C_1''(X_u)>0$ $\quad C_2''(I_u)>0$ iii) $R'(I_o)>0$ $\quad R_o''(I)>0$

Condition (i) implies that the costs of smuggling both exports and imports rise with the volume of exports and imports smuggled. Condition (ii) implies that the costs of smuggling rise at an increasing rate. Condition (iii) says that the costs

of lobbying to import through official channels increase with the volume of imports and at an increasing rate. Any exports or imports going through illegal channels are valued at the black market exchange rate b, while those traded through official channels are valued at the official exchange rate, e. The cost of smuggling is denominated in dollars: agents have to give up a portion of their export earnings through the black market. Similarly one can think of the costs of smuggling as bribes (etc.)-- some imports which are scarce are given up to pay for the privilege of importing illegally. Importers lobby to import through official channels. The actual cost of importing is higher by the cost of lobbying. We represent these as dollar costs-- again we can think of importers being allowed to import at the official exchange rate by paying some of these import goods as bribes.

The first order conditions for the maximization problem are given below:

FOC:

$$\text{(i)}\quad \frac{\delta}{\delta L_1} = 0 \rightarrow \quad aP_N\, N = WL_1$$

$$\text{(ii)}\quad \frac{\delta}{\delta I} = 0 \rightarrow P_N\, N = \frac{b}{(1-a)}\,(1+C_2'(I-I_o))I$$

$$\text{(iii)}\quad \frac{\delta}{\delta I_o} = 0 \rightarrow (\phi-1) = R' - \phi C_2'$$

δ

$$\text{(iv)}\quad \frac{}{\delta Lu} = 0 \rightarrow -eP_x + bP_x - bC_1'(X_u) \geq 0$$

$$\text{or}\quad X_u = X_u(\phi, P_x)$$

$$\text{(v)}\quad \frac{\delta}{\delta L_o} = 0 \rightarrow eP_x = w$$

FOC (i) says that a fraction 'a' of nontradable production is equal to total wage payments in the nontradable sector. This is characteristic of the Cobb-Douglas production function: a factor's share in total output is determined by the production coefficient, 'a' in the case of labor. FOC (ii) says that the marginal revenue of the imported input must equal the marginal cost of obtaining it. FOC (iii) says that at the margin, the costs of importing through official versus unofficial channels must be equalized otherwise it will always pay agents to switch from one channel to another. FOC (iv) says that, at the margin, the benefits from exporting through official versus unofficial channels must be equalized. eP_x represents the revenues obtained in cedis per unit of output exported through official channels. This must be equal to the net revenue from smuggling or the difference between bP_x, which represents the marginal value (in cedis) of exporting through illegal channels and the marginal cost of smuggling out exports, $bC_1 (X_u)$. Again, if this were not so, it would pay exporters to switch exports from illegal to legal channels or vice versa. FOC (v) says that the marginal benefit from producing (and exporting) must be equal to the wage rate. Note that exports are produced with labor alone and

according to a linear production function and the costs of production are therefore determined by labor costs. Since all markets are perfectly competitive, marginal revenue is set equal to marginal cost to determine the wage rate. The world price of exports in dollars is P_x, and the official exchange rate is e. Thus the marginal gain from exporting through official channels in cedis, is eP_x. This determines the wage rate in cedis.

b.) Balance of Payments

We assume that agents in this economy hold non-interest bearing assets alone. The balance of payments in this economy is shown in equation (5) below:

$$(5)\ \dot{F}=P_xX - I - g = P_x(\bar{L}-L_1) - I - g_I$$

where $\dot{F}$ = total accumulation of foreign assets. We can use the balance of payments equation (5), equation (c) and first order conditions (i) and (ii) to solve for L_1 and I in terms of $\dot{F}$, g_I, P_x and ϕ :

$$(6a)\ L_1 = L_1(P_x, g_I, \phi, \dot{F}) \qquad (?, -, +, -)$$

$$(6b)\ I = I(P_x, g_I, \phi, \dot{F}) \qquad (+, -, -, -)$$

An increase in the black market premium increases the allocation of labor in the nontradable sector. This is because an increase in the premium represents an increase in the implicit tax on exports; as the tax rises agents substitute labor towards the production of nontradables. An increase in

government spending on importables lowers the supply of labor to the nontradable sector. There are two reasons for this: an increase in government spending on importables in this model must be met by a decrease in government consumption of nontradables thus reducing the total demand for nontradables. Also, if government spending on importables increases then, given the trade balance, either exports must increase or imports must fall or both. Both these effects tend to reduce the allocation of labor to the nontradable sector. Production of exports must increase at the cost of nontradable production.

An increase in the trade surplus will reduce the allocation of labor to the nontradable sector. An increase in the trade surplus implies a reduction in domestic absorption or an increase in the production of tradables both of which will tend to reduce nontradable production and therefore the allocation of labor to the nontradable sector.

An increase in the terms of trade has ambiguous effects on the labor allocated to the nontradable sector. On the one hand, it raises the return to the production of tradables, while, on the other hand, it lowers the relative price of importables and therefore also raises the net return in the production of nontradables.

An increase in the black market premium raises the marginal cost of foreign exchange and therefore the cost of imports. Thus imports fall as the premium rises. An increase in the terms of trade lowers the relative price of importables and

therefore agents import more given the trade balance. An increase in the trade surplus, ceteris paribus, implies a reduction in imports. An increase in government spending on importables given the trade balance must imply a reduction in imports since the supply of foreign exchange to the private sector falls.

c.) Consumption

We assume that agents consume only nontradables: and consume a constant fraction γ of their wealth.[52] Wealth is defined as the sum of domestic and foreign currency:

(8) $M+bF=W$

where F is agents' holdings of foreign currency. Therefore consumption spending is defined as:

(9) $P_N C_N=\gamma(M+bF)$

Using equation (9) and Foc (i) and (ii), the balance of payments equation can be rewritten as:

(7) $\dot{F}=\bar{P}_X(L-L_1(\phi,\dot{P}_X,F,g_T)) - g_T z - I(m,F,\phi,z,g_T)$

d.) Money Demand

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[52]The assumption that agents consume only nontradables is a simplifying one; the conclusions do not depend on this assumption but the algebra is simpler.

As mentioned before, agents in this economy hold only non-interest bearing domestic and foreign currencies. We denote the fraction of money held in total wealth as λ; this fraction λ, is a decreasing function of the expected rate of depreciation in the black market. Following Lizondo we assume that agents possess perfect foresight: the expected rate of inflation equals the actual rate of inflation. At the steady state this rate of inflation is equal to the rate of depreciation of the domestic currency. Therefore money demand (M) is given by equation (8):

$$(8)\quad M = \lambda(\dot{b}/b)\, W$$

Assuming that private agents can adjust their portfolio composition instantly to the desired level:

$$(9)\quad M = \frac{\lambda(\dot{b}/b)}{(1-\lambda(\dot{b}/b))}\, bF$$

Since the rate of depreciation of the cedi in the black market determines the relevant differential rate of return between money and foreign currency for the private sector λ is a decreasing function of the black market rate of depreciation.[53]

Using $m = M/e$ and $\phi = b/e$ equation (9) can be rewritten as equation (10) below:

$$(10)\quad m = \frac{\lambda(\dot{\phi}/\phi+\dot{e}/e)}{(1-\lambda(\dot{\phi}/\phi+\dot{e}/e))}\,\phi F$$

Equation (10) above is our differential equation in ϕ.

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[53]There are no interest bearing assets.

2.) The Steady State

The dynamic equations of our system are:

$$(11)\quad \dot{F} = P_x(\bar{L}-L_1(\phi,P_x,g_I,\dot{F})) - zg_T - I(m,F,\phi,zg_T)$$

$$(12)\quad \dot{m} = g_T - t - \hat{e}m - A$$

$$(13)\quad m = \frac{\lambda(\dot{\phi}/\phi+\dot{e}/e)}{(1-\lambda(\dot{\phi}/\phi+\dot{e}/e))}\,\phi F$$

Equations (11)-(13) can be solved for the steady state of the economy. The steady state system is saddlepath stable; if an increase in the black market premium improves the unofficial trade balance. This is what we would expect since an increase in the premium raises black market exports (the tax on official exports increases) while it reduces black market imports. The steady state solution for the black market premium is given below:[54]

$$(14)\quad \phi=\phi(g_T,t,\hat{e},A)\quad \phi g_t>0,\ \phi_t<0,\ \phi\hat{e}<0,\ \phi_A<0$$

The derivative of the black market premium with respect to government spending is of particular interest: an increase in government expenditure will raise the black market premium. This is because an increase in government consumption reduces the supply of dollars available for the private sector since part of the increase in government spending is on importables.

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[54]Note that there are bounds on the level of the black market premium ϕ. The maximum value ϕ can take is constrained by the condition that $P_x X_0 = g_I$, or that all official export earnings are spent by the government. The minimum value it can take is unity which implies that there is no rationing of foreign exchange.

This implies that the black market price of foreign exchange (which is the marginal cost of foreign exchange) will be pushed up. A reduction in conventional tax revenues will reduce the premium. This is because the lower the tax revenues collected, the greater will be the reliance on inflationary financing. The higher is the rate of inflation (and therefore, the inflation tax) the higher will be the associated steady state level of money. To restore portfolio balance, the premium must rise. A improvement in the terms of trade will, given government expenditure, ease the supply of dollars to the private sector and therefore reduce the black market premium (which is the marginal cost of foreign exchange).

An increase in aid flows to Ghana raises the resources available to the government and reduces its reliance on inflationary financing. This lowers the steady state level of money balances and we therefore need a lower premium to restore portfolio balance.

An increase in the rate of official depreciation has ambiguous effects: the direction of the effect depends upon the inflation elasticity of the share of domestic money in wealth, λ. There are two distinct effects of an increase in the expected rate of

depreciation ($\frac{\Delta e}{e}$) (i.e. an increase in the expected inflation rate). Suppose $\frac{\Delta e}{e}$ is raised. The differential rate of return between cedis and dollars rises making dollars more attractive.

The greater demand for foreign exchange would tend to raise the black market premium. However there is another effect which works in the opposite direction: with the real deficit given, a smaller cedi base would be required for the inflation tax. The steady state

inflation tax is given by $\frac{\Delta e}{e}M$ where M is the nominal money supply, or by $\lambda(W/e)(\Delta e/e)$, so that $\lambda\Delta e/e$ is defined as the unit inflation tax. We assume that rises with e, but has the shape of a Laffer Curve as shown in Figure 5.5. Suppose $\Delta e/e$ rises but the inflation elasticity of λ is less than unity. (We are on the left hand side of the curve in Figure 5.5. Then the unit inflation tax will actually rise (total inflation tax revenues will actually rise), the supply of dollars will ease and the premium will fall. However if the inflation elasticity of λ is greater than unity then the inflation tax revenues will fall and the premium will rise (we will be on the right hand side of the Laffer Curve-past the revenue maximizing inflation rate).

a.) <u>The effects of a devaluation</u>

The effect of a one time devaluation in this model is only temporary. A devaluation, by raising the nominal exchange rate will immediately lower the real money stock, M/e=m. At the original premium, there will be a portfolio imbalance; agents will have a greater proportion of foreign assets in their portfolio than they desire. To restore portfolio balance two things happen: (i) the black market premium falls immediately to

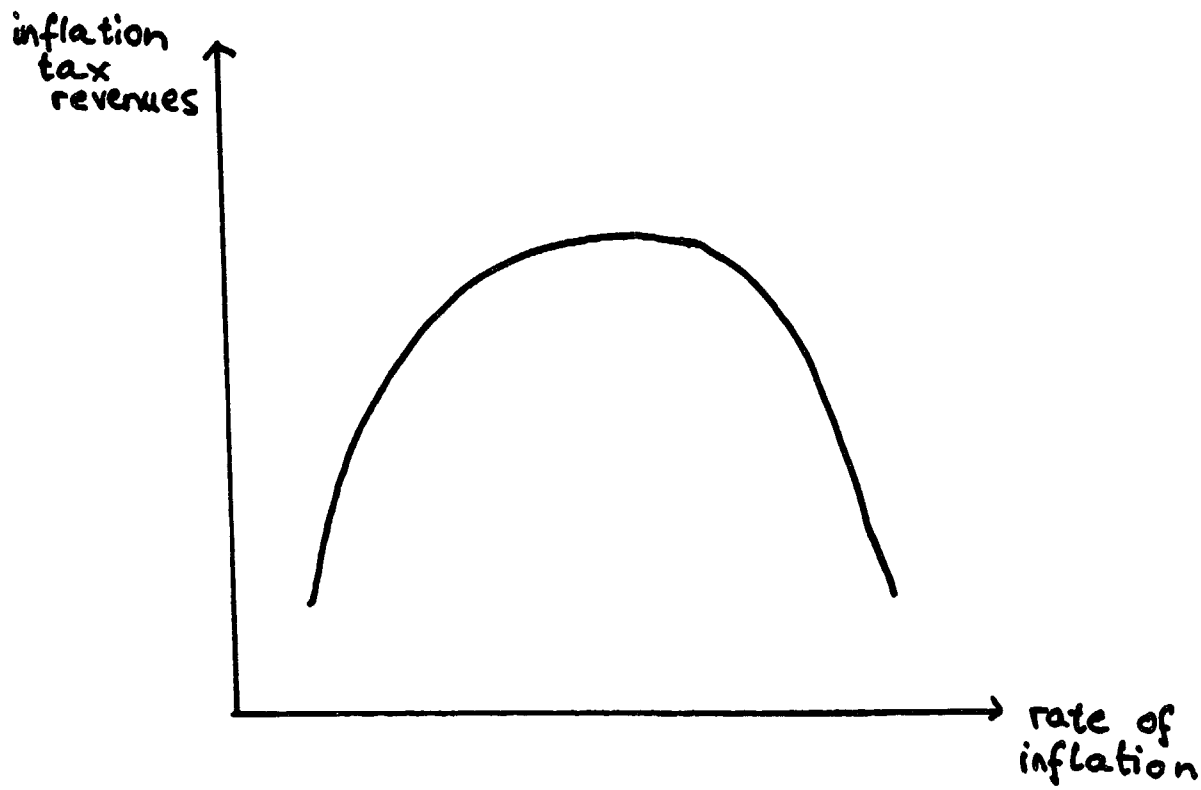

Figure 55.

reduce the share of foreign assets in wealth and (ii) as the premium rises to its steady state level the rate of inflation is higher and the desired ratio of foreign assets in wealth ($1-\lambda$), increases.[55] Thus a devaluation will temporarily reduce the black market premium. However, if the fiscal deficit remains the same the premium will gradually return to its original steady state level.

b. <u>The real exchange rate and the trade balance</u>

The official real exchange rate is defined as the relative price of tradable to nontradable goods:

$$(15)\quad eP_x/P_N = a(L_1^{a-1}/I)$$

$$\text{Since } P_N = eP_xL_1/aN = eP_x/a\ (L_1/I)^{1-a}$$

Using equations (6a) and (6b) we can write the official real exchange rate in terms of the black market premium, the terms of trade, the trade surplus and government spending. It can be shown that the official real exchange rate is a negative function of the black market premium so that an increase in the premium lowers (appreciates) the official real exchange rate while a decrease in the premium raises the official real exchange rate. This is because a higher premium raises the cost of imports which are an input into nontradable production and raises the relative price of nontradables.

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[55] $\lambda = \lambda(\phi + e)$: with e given any increase in ϕ will lower λ.

An increase in the trade surplus leads to a real exchange rate depreciation, given the premium, since a higher trade surplus implies a lower domestic absorption and therefore lower demand for nontradables. This puts downward pressure on the price of nontradables leading to a depreciation of the real exchange rate. An increase in government consumption of tradables also causes a real exchange rate depreciation. This is because, under the assumption of a given level of government expenditure, any increase in government consumption of tradables, given g_T, implies a reduction in the government's consumption of nontradables. The lower demand for nontradables lowers their price and depreciates the real exchange rate.

A terms of trade improvement has ambiguous effects. There are two factors to consider: an improvement in the terms of trade means an increase in the relative price of tradable to home goods. this tends to depreciate the real exchange rate. However, the higher relative price of exports induces substitution in production towards tradables: this will tend to raise the price of nontradables and appreciate the real exchange rate. The net effect could be either positive or negative, however, one can usually expect the direct effect of the increase in the premium on the price of exports to exceed the indirect effect on the price of nontradables.

The black market real exchange rate is defined as:

$$(16)\ \frac{bP_x}{P_N} = \frac{bP_x a}{eP_x}\left(\frac{L_1^{(\theta-1)}}{I}\right) = \phi a\left(\frac{L_1^{(\theta-1)}}{I}\right)$$

The effects of a change in the premium on the black market real exchange rate are ambiguous. This is because an increase in the premium raises the returns from exporting in the black market. At the same time however, nontradable production falls (since imports become more expensive). This tends to raise the price of nontradables. The net effect on the black market relative price of exportables to nontradables may be either negative or positive. An increase in government consumption of tradables, an increase in the terms of trade and an increase in the trade surplus are all expected to have similar effects on the black market real exchange rate as on the official exchange rate, given the premium.

When we substitute in for the steady state determinants of the black market premium, we may write the steady state official real exchange rate as a function of the terms of trade, the official rate of depreciation, aid flows to Ghana, tax revenues, and government spending. The effect of an increase in government spending on the real exchange rate is negative. An increase in spending has a negative effect on the real exchange rate through two channels: an increase in spending that represents partly an increase in spending on nontradables will raise the relative price of nontradables. An increase in government spending will also raise the black market premium. This will again tend to make imported inputs more expensive and therefore raise the price of nontradables which use these inputs.

An increase in the price of exports, P_x will raise (depreciate) the real exchange rate. A higher relative price for exports implies a larger supply of foreign exchange premium, given government spending, and therefore a lower price for foreign exchange. As explained previously, as the premium falls the real exchange rate will depreciate.

An increase in tax revenues will tend to depreciate the real exchange rate. Higher tax revenues will lower the black market premium and therefore lower the price of nontradables. The effect of an increase in the rate of depreciation (and inflation) on the real exchange rate is ambiguous since the effect on the premium is ambiguous. If $\delta\phi/\delta\hat{e} < 0$ i.e. if the inflation elasticity of the demand for money in wealth is less than unity then the real exchange rate would rise (depreciate) with an increase in the rate of depreciation.[56]

An increase in aid flows is expected to depreciate the real official exchange rate. This is because, in our model, an increase in aid flows to Ghana represents an increase in net resources available to the government and therefore reduces the government's reliance on money financing. With a lower stock of money, the black market premium has to rise less to restore portfolio balance. Also, a reduction in the premium lowers the cost of imports and therefore of nontradables. This would put downward pressure on the price of nontradables and depreciate

[56]Separate estimates of money demand indicate that the inflation elasticity of money demand is less than unity.

the real exchange rate.

Note that at the steady state the trade balance is zero.[57]

While it is useful to consider the steady state determinants of the real exchange rate and the black market premium, a look at the non-steady state relationships between the premium, the trade balance, the real exchange rate and public sector expenditure is particularly useful in the context of this model. This is because the analysis of the steady state assumes that the rate of inflation equals the rate of official depreciation. This was obviously not true for Ghana in the last decade and a half when the official exchange rate was kept fixed with some discrete devaluations, but the rate of inflation was very high.

The trade balance equation is reproduced below:

$$\dot{F} = P_x (L - L_1) - zg_T - I(\phi, m, F, g_T, z)$$

The black market premium itself is a function of the trade balance, the stock of money, the stock of foreign assets, government expenditure and the terms of trade:

$$(17)\quad \phi = \phi(\dot{F}, m, F, z, P_x, g_T)$$

---

[57]If agents held interest bearing foreign assets then private agents foreign asset accumulation would consist of the sum of net interest payments plus the trade surplus/deficit. $\dot{F}$ would be the current account. In this case the trade balance would not be zero at the steady state.

An increase in the stock of money will require an increase in the black market premium to restore portfolio balance. An increase in the stock of foreign assets implies an increase in private sector wealth and therefore an increase in private sector consumption. The higher consumption demand (and thus the higher demand for imports and foreign exchange) raises the black market premium. An increase in government expenditure raises the black market premium since part of the increase in expenditure (given z) is spent on importables. Higher government consumption of importables implies that less foreign exchange will be available for the private sector and given demand will have the effect of raising the black market premium.

An improvement in the terms of trade, given F, the trade balance, will have an ambiguous effect on the black market premium. On one hand, it will tend to raise the production of tradables relative to nontradables. On the other hand, by raising wages, it will induce substitution towards imported inputs and away from labor in the nontradable sector: thus imports rise. This may put upward pressure on the black market premium depending on the relative short run responses of exports and imports given the trade balance.

An improvement in the trade balance is accompanied by a lower premium. This is because an improvement in the trade balance implies a larger supply of foreign exchange in the black market. The trade balance equation can be rewritten in terms of the stock of money, the stock of foreign currency held by

private agents, the terms of trade, and public sector expenditure. This is done by substituting out for the black market premium in equation (18) below:

(18) $F = F(P_x, m, F, z, g_T)$

The trade balance depends positively on the terms of trade. This is because an increase in the terms of trade raises export revenues at every level of exports, and also raises the production of tradables by inducing agents to substitute away from nontradable to tradable production. An increase in the stock of money could have either a negative effect or positive effect on the trade balance. Firstly, a higher stock of money implies greater wealth for the private sector and therefore greater consumption demand (for nontradables). This will put upward pressure on the relative price of nontradables and agents will substitute production towards nontradables. Since imports are used in nontradable production imports must rise and the trade balance tends to deteriorate. On the other hand, an increase in the stock of money held by the private sector, given the trade balance, is associated with a higher black market premium. The higher premium reduces imports (and exports, but less so) and improves the trade balance.[58] This makes sense if we recall that the overall trade balance reduces to the unofficial trade balance since, by construction, the official

[58]This is the condition for saddlepath stability.

sector is always in balance. Thus an increase in the stock of real balances may improve the trade balance.

An increase in the stock of foreign currency has similar effects since it also represents an increase in wealth.

An increase in public sector expenditure has a negative effect on the trade balance in two ways: first, an increase in the government's consumption of importables has a direct impact on the trade balance. Second, an increase in government consumption of nontradables raises imports (which are used in nontradable production) and deteriorates the trade balance.

The official real exchange rate can also be written in terms of the terms of trade, the trade balance, the stock of real money balances, the stock of foreign currency, total public sector expenditure and public sector expenditure on importables. An improvement in the trade balance leads to an appreciation of the real exchange rate. This is because, a higher trade surplus implies lower imports or higher exports or both. If the lower imports/higher exports come at the expense of nontradables production the relative price of nontradables will rise and this will lead to appreciation of the official real exchange rate.[59]

An increase in public sector expenditure on importables given total expenditure (i.e. an increase in 'z') implies a reduction in public sector expenditure on nontradables. Lower

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[59]The black market premium will rise with an increase in z. This is because higher government expenditure on importable means that the supply of official foreign exchange to the private sector falls and thus the price of foreign exchange increases.

demand for nontradables implies downward pressure on the price of nontradables and leads to real exchange rate depreciation. If total public sector expenditure increases, given that the share of imports in total expenditure is fixed, part of the increase will fall on nontradables. This will put upward pressure on the price of nontradables and lead to real exchange rate appreciation.

An increase in the stock of real balances will raise wealth, and therefore consumption (of nontradables). This will put upward pressure on the price of nontradables and lead to real exchange rate appreciation. The same holds for an increase in the private sector's stock of foreign currency.

The effect of the devaluations and other policy changes that occurred in Ghana from 1983 on can be analyzed through this model. As discussed before, one-shot devaluation is expected to reduce the premium temporarily by lowering the real money stock instantaneously. Thus we should expect to see a drop in the black market premium (which we did). For the following years the exchange rate regime did not change significantly-- there were a number of discrete devaluations from 1983 to 1987, tax collection methods improved and aid flows to Ghana started to rise. In this way the government gradually switched to alternative means of financing of a lowering level of government expenditure.[60] All these events would, in this model, lower the

[60]Higher aid flows means lower money financing and therefore a lower steady state premium.

black market premium. This, in fact, happened-- the black market premium started to fall in 1983 and continued to fall dramatically thereafter, as the fiscal deficit fell. This can be seen in Table 5.1 and in Figures 5.1 and 5.2.

In 1987 the government undertook policies aimed at unifying the official and black markets for foreign exchange. In view of the fact that the fiscal deficit has been falling, and the reliance on money financing has been falling, there was not a substantial differential between the black market and official exchange rates. In fact, by 1988 and 1989 the black market premium had fallen dramatically.

In the context of the current model, unification could lead to an increase in the rate of inflation under certain circumstances. The higher the black market premium before unification, the larger the implicit tax on exports and therefore the more important is the black market premium as a source of revenue for the government. Upon unification the government loses the implicit tax on exports and must rely on a higher inflation tax. In the case where $\lambda < 1$ (which is the case for Ghana, as discussed previously) and the exchange rate system is unified so that $\phi = 1$ inflation may rise on unification. If the steady state rate of inflation was e (= b) then with $\phi_{ss} = \phi_{ss}$ (e, t, A, g_T, P_x), the rate of inflation must rise when ϕ falls if all other factors remain the same. If, at the same time, however, other factors change such as: government expenditure falling, aid flows rising or the terms of trade

improving, all of which would reduce the steady state premium, then unification may not lead to an increase in inflation-- it may even be accompanied by a reduction in inflation.[61] In fact, it may be that the slight increase in inflation after 1986 may be partly due to the gradual unification of the exchange rate regime, and it is also probably true that if the government had tried to unify the exchange rate without any fiscal adjustment, we would have seen higher inflation in 1988 and 1989 (inflation was around 24% from 1988-III to 1989-III).

3.) Empirical evidence

a.) The steady state

This section examines the empirical evidence in two parts: first, we consider the regression results for the steady state determinants of the black market premium, and the real exchange rate. The second part looks at the non steady-state regression results for the trade surplus, and the official real exchange rate. The variables used in the regressions of part I are as follows:

PREM2 = the average black market premium

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[61]If the government were a net seller of foreign exchange this may not be true. In this case the black market premium acts as a conduit for transfers from the government to the private sector, and a reduction in the premium would mean a net reduction in subsidies to the private sector and post unification inflation could fall.

FD2=public sector deficit in dollars

TOT=the terms of trade

AID=aid flows to Ghana in dollars

EXDEP=the official rate of depreciation using average exchange rates

RER= the official real exchange rate calculated using the average official exchange rate.

DV83=a dummy variable for 1983, the beginning of the Economic Recovery Program

In equation (a) we see that both the terms of trade and the fiscal deficit are significant in determining the premium and have the expected signs. Aid flows were not econometrically significant and have been dropped from the equation; we would expect higher aid flows to be associated with lower black market premia since aid flows represent a source of revenue to the government and reduce the government's reliance on money financing of the deficit.[62] As expected, an increase in the fiscal deficit will raise the black market premium. A higher fiscal deficit must be financed by printing money. A higher stock of money requires a higher black market premium for portfolio balance: thus large deficits are associated with high premia. The coefficient on the official rate of depreciation is negative implying that the inflation elasticity of money demand

[62]Less of a reliance on money financing implies that a lower premium is required to restore portfolio balance.

Equation a

LS // Dependent Variable is PREM2
Date: 7-09-1990 / Time: 10:31
SMPL range: 1970 - 1987
Number of observations: 18

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	4.5305050	1.5139230	2.9925598	0.010
TOT	-0.0249831	0.0107270	-2.3289956	0.037
DV83	5.7677072	6.9228176	0.8331445	0.420
EXDEP	-0.0023348	0.0070727	-0.3301128	0.747
FD2	0.0057277	0.0006620	8.6527109	0.000

R-squared	0.875364	Mean of dependent var	4.128039
Adjusted R-squared	0.837014	S.D. of dependent var	3.133399
S.E. of regression	1.265001	Sum of squared resid	20.80297
Durbin-Watson stat	2.219636	F-statistic	22.82584
Log likelihood	-26.84341		

Equation b

LS // Dependent Variable is PREMIUM
Date: 7-09-1990 / Time: 10:24
SMPL range: 1971 - 1987
Number of observations: 17

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	27.318078	7.0921050	3.8518998	0.002
TOT	-0.2111033	0.0508114	-4.1546408	0.001
FD2	0.0157124	0.0032087	4.8967507	0.000
EXDEP	-0.0151802	0.0069070	-2.1978097	0.047

R-squared	0.735244	Mean of dependent var	6.082630
Adjusted R-squared	0.674146	S.D. of dependent var	10.48394
S.E. of regression	5.984616	Sum of squared resid	465.6031
Durbin-Watson stat	1.887127	F-statistic	12.03391
Log likelihood	-52.25798		

in Ghana is less than unity, however, the t-statistic is insignificant. [63] The dummy variable for 1983 is used to capture the effects of the various policy changes in Ghana in 1983 on the premium.[64] The dummy variable is insignificant. Equation (b) shows a similar regression with the end of period black market premium (PREMIUM). All the variables have the expected signs. However, aid flows are insignificant and have been dropped from the equation.

Equation (c) shows the regression of the official real exchange rate against the relevant explanatory variables where:

RER= the official real exchange rate

TOT= the terms of trade

FD2= the fiscal deficit

AID= aid flows

In equation (c) we see that the public sector deficit, is significant. The expected rate of depreciation and the terms of trade are not econometrically significant determinants of the real exchange rate and have been dropped from the equation.[65]

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[63]This is consistent with our estimates of the money demand function for Ghana.

[64]We have used rational expectations in this model and the official rate of depreciation equals the expected and actual rate of inflation at the steady state.

[65]First differencing the relationship gives the same results with only the fiscal deficit significant.

Equation c

LS // Dependent Variable is RER
Date: 7-09-1990 / Time: 10:26
SMPL range: 1972 - 1987
Number of observations: 16
Convergence achieved after 2 iterations

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	114.24041	7.4297634	15.376050	0.000
FD2	-0.0657257	0.0081465	-8.0679843	0.000
AID	-0.1328062	0.0348994	-3.8053979	0.003
DV83	-57.261645	16.427083	-3.4858073	0.005
AR(2)	-0.4269909	0.4278738	-0.9979366	0.340

R-squared	0.828371	Mean of dependent var	51.68565
Adjusted R-squared	0.765960	S.D. of dependent var	34.74519
S.E. of regression	16.80891	Sum of squared resid	3107.936
Durbin-Watson stat	1.810349	F-statistic	13.27291
Log likelihood	-64.85602		

An increase in the flow of aid to Ghana is expected to depreciate the official real exchange rate but the coefficient on aid flows is negative. We expect a positive coefficient because higher aid means lower reliance on money financing, and therefore a lower steady state money stock and a lower premium to achieve portfolio balance.[66] The negative coefficient can be explained if we assume that part of the foreign aid flows represent transfers to the private sector. In such a case, private consumption of nontradables would increase as would therefore the price of nontradables and the real exchange rate would fall (appreciate). A higher level of government spending implies a greater demand for nontradables. Thus higher government spending is associated with a higher relative price for nontradables and a more appreciated real exchange rate. We see that in fact, the fiscal deficit is by far the most important factor affecting the real exchange rate.

b.) Non-steady state

In this section we estimated the following (non-steady state) relationships, where the variables are as defined previoulsy in the text:

$F = F(m, F, g_T, P_x, z)$,

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[66]To recapitulate, a lower black market premium depreciates the official real exchange rate because it makes imported inputs cheaper and lowers the price of nontradables relative to the price of exportables which are constant given the official exchange rate and the world price of exportables.

$RER = RER(m, F, g_T, P_x, z)$ and

$\phi = \phi(F, P_x, m, F, g_T)$

Equations (d),(e) and (f) show the results of the estimation with the variables defined as follows:

TS2= the trade surplus in dollars

PSD2 = public sector expenditure in dollars

TILMOND = the stock of privately held foreign assets in dollars

TOT = the terms of trade

MONEYD = the stock of money in dollars (M1)

WLTHD2 = wealth in dollars

L denotes lagged values.[67]

Data on the stocks of foreign currency held by the private sector was not available. The data up to 1982 was taken from Ernesto May's estimates of the parallel market economy in Ghana (or the volume of illegal money as he refers to it). The data for the stock of foreign assets after 1982 was derived using May's 1982 stock figure and the estimated change in the size of the black market relative to the legal market for currency based on the change in the black market premium.[68]

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[67]For variables related to the stock of wealth I have used lagged values since it seems reasonable that the stock of wealth at the end of the preceding period determines consumption in the present period.

[68]This was done by assuming that the proportion of illegal to legal activities fell/rose in the same proportion as the black market premium.

Equation d

LS // Dependent Variable is TS2
Date: 7-09-1990 / Time: 10:27
SMPL range: 1971 - 1987
Number of observations: 17
Convergence achieved after 3 iterations

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	-266.29253	129.33074	-2.0590042	0.064
TILMONDL	-0.8823213	1.0341880	-0.8531536	0.412
MONEYDL	0.0757216	0.0415255	1.8234968	0.095
PSD2	-0.0801810	0.0381832	-2.0999000	0.060
TOT	2.6078071	0.8553298	3.0488907	0.011
AR(1)	-0.4851280	0.2783789	-1.7426896	0.109

R-squared	0.539113	Mean of dependent var	46.90588
Adjusted R-squared	0.329620	S.D. of dependent var	130.4055
S.E. of regression	106.7718	Sum of squared resid	125402.4
Durbin-Watson stat	2.362182	F-statistic	2.573409
Log likelihood	-99.82355		

Equation e

LS // Dependent Variable is RER
Date: 7-09-1990 / Time: 10:28
SMPL range: 1972 - 1987
Number of observations: 16
Convergence achieved after 6 iterations

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	115.16474	8.1844943	14.071088	0.000
TILMONDL	-0.2379984	0.0744803	-3.1954526	0.010
PSD2	-0.0338936	0.0044642	-7.5922894	0.000
DV83	-25.550855	8.0151391	-3.1878243	0.010
AR(1)	0.8364084	0.2522426	3.3158887	0.008
AR(2)	-0.6428042	0.2574228	-2.4970754	0.032

R-squared	0.929535	Mean of dependent var	51.68565
Adjusted R-squared	0.894302	S.D. of dependent var	34.74519
S.E. of regression	11.29610	Sum of squared resid	1276.018
Durbin-Watson stat	2.192499	F-statistic	26.38272
Log likelihood	-57.73430		

Since the data for privately held foreign assets must be subject to a great deal of measurement error, a proxy variable was initially estimated and used in the regressions. The use of a proxy for private sector wealth did not improve the results; therefore the final equations presented are based on the initial estimated figures.

Equation (d) shows the results for the trade balance equation. We see that both the terms of trade and public sector expenditure are significant while private sector wealth is not. To recapitulate, we would expect public sector expenditure to have a negative effect on the trade balance since a part of the increase in government expenditure falls on importables so that, ceteris paribus, total imports increase. The terms of trade are also an important factor in determining the trade balance with an improvement in the terms of trade being associated with an improvement in the trade balance. Considering that Ghana's export base is very narrow, this is cause for concern over the longer terms. A long-term downward trend in cocoa prices could lead to a prolonged period with a deteriorating trade balance. We see that private sector wealth enters with a positive sign. An increase in private sector wealth has two effects: it has a direct effect on imports (it raises them) and it also raises the black market premium which has an overall positive effect on the trade balance. We see that the effect through the premium

dominates.[69]

Estimation of the equation for the official real exchange rate (e), shows that the public sector deficit and private sector wealth were the two most important factors affecting the official real exchange rate.[70] Public sector expenditure is seen to have a negative effect on the official real exchange rate since an increase in public sector expenditure, part of which is spent on nontradables will raise the price of nontradables and appreciate the official real exchange rate. Thus we can attribute some of the real exchange rate appreciation that occurred (given a fixed nominal official exchange rate) from the early part of the 1970s to 1982 to rising public sector expenditures. Private sector wealth, represented by the stock of foreign assets in this equation, also appreciates the real official exchange rate by raising domestic consumption demand.[71]

Equation (f) shows that the black market premium is significantly affected by both public sector expenditure and the stock of real wealth. As expected, both variables have a

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[69]The error process in this equation has the following form: $e_t = \theta_1 e_{t-1} + \theta_2 e_{t-2} + v_t$. This process is stationary if $\theta_1 + \theta_2 < 1$, $\theta_2 - \theta_1 < 1$ and $-1 < \theta_2 < 1$. These conditions are satisfied for our equation.

[70]The terms of trade was found to be insignificant and was dropped from the equation. If the sum of the real money stock and the private sector's stock of foreign assets is used (wealth) it is significant. When the money stock and the stock of foreign assets are entered separately we find that only the stock of foreign assets is significant.

[71]Again, the error process is stationary.

Equation f.

LS // Dependent Variable is PREM2
Date: 8-08-1990 / Time: 18:41
SMPL range: 1970 - 1987
Number of observations: 18
Convergence achieved after 1 iterations

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	-0.2178981	0.3895180	-0.5594044	0.585
PSD2	0.0020751	0.0003033	6.8426687	0.000
WLTHD2L	0.0009491	0.0002265	4.1900329	0.001
TS2	-0.0016625	0.0018785	-0.8849832	0.392
AR(1)	-0.2372703	0.2666116	-0.8899473	0.390

R-squared	0.926335	Mean of dependent var	4.128039
Adjusted R-squared	0.903669	S.D. of dependent var	3.133399
S.E. of regression	0.972522	Sum of squared resid	12.29539
Durbin-Watson stat	2.042507	F-statistic	40.86858
Log likelihood	-22.11056		

positive effect on the premium. Note that a devaluation will reduce the existing stock of real balances and therefore have a temporary negative effect on the premium.

4.) Conclusion

This study has attempted to determine the importance of the government of Ghana's fiscal and monetary policies for its foreign exchange and trade sector. It has done this by focusing on the effect of the fiscal deficit on the parallel market for foreign exchange in Ghana which had achieved large proportions during the last two decades. Any study that aims to understand the macroeconomy by examining the data available must take the parallel economy and the effect of the black market premium on macroeconomic variables into account. At present, the Ghanaian authorities are attempting to gradually switch to a completely market determined exchange rate system. One might argue therefore that the model and analysis in this section of the paper is not useful for analyzing the possible effects of future government policy. While this may be true, any analysis based on historical data and evidence that ignored the dual foreign exchange markets would not present a true picture of the economy. Also, (as mentioned above), the exchange rate system has still not been unified: there are still three exchange rates in Ghana, the official or auction rate, the rate determined at the various privately owned foreign exchange bureaus (this rate is slightly more depreciated than the 'official' rate) and a

black market rate applicable to a tiny fraction of the total foreign exchange market.

The main conclusion that can be derived from this analysis is that public sector expenditure (and hence the deficit) in Ghana had a significant effect on the official real exchange rate, the trade balance, and the black market premium. It was found that only the terms of trade and public sector expenditure have a significant effect on the trade balance with higher terms of trade being associated with an improved trade balance and higher public sector expenditure being associated with a worsened trade balance. To estimate the effect of rising public sector expenditure on the trade balance, we used equation (d) to estimate what the trade balance would have been if public sector expenditure had been kept at its 1970 level. Table 5.5 shows these results. TBSIM7 is the estimated trade surplus with public sector expenditure constant at the 1970 level. TS2 is the actual trade surplus. We see that in almost all of the years the trade surplus would have been substantially larger if public sector expenditure had remained constant. We see for instance, that in 1981, instead of a $244 million deficit we would have had a $313 million surplus. TBSIM8 shows what the trade surplus would have been if the terms of trade had remained at their 1970 level and TBSIM9 shows the trade surplus estimates with the terms of trade held at their 1974 (high) level.

It was found that public sector expenditure had a significant and negative effect (higher public sector

Table 5.6

obs	TS2	TBSIM1	TBSIM2
1972	161.4000	100.9095	140.5371
1973	212.9000	69.48497	37.99500
1974	-29.20000	145.8486	-2.365343
1975	150.4000	277.1313	84.74670
1976	88.80000	132.7098	-30.20210
1977	29.40000	274.7321	-34.94573
1978	112.5000	392.9107	62.61076
1979	262.6000	375.7671	112.6678
1980	195.3000	254.9200	-42.50335
1981	-243.6000	126.9057	-112.1375
1982	18.30000	320.5255	162.8363
1983	-60.60000	224.8574	226.6860
1984	32.90000	109.2007	191.9060
1985	-36.30000	-20.62268	75.31867
1986	60.90000	46.93408	118.0571
1987	-124.7000	-6.206130	85.94793

Table 5.6

obs	TBSIM7	TBSIM8	TBSIM9
1971	65.21729	94.71545	260.4107
1972	108.8995	155.4391	321.1344
1973	114.2091	81.29379	246.9891
1974	20.00041	-129.2766	36.41867
1975	260.5240	-52.27610	113.4192
1976	326.0856	-22.41397	143.2813
1977	332.2414	-192.7995	-27.10421
1978	526.1377	-29.22338	136.4719
1979	713.6807	91.61805	257.3133
1980	530.9646	-64.58118	101.1141
1981	312.9992	-185.1746	-19.47933
1982	573.7642	144.1943	309.8896
1983	485.6838	341.3074	507.0027
1984	354.2082	379.3806	545.0759
1985	136.9636	317.2038	482.8991
1986	151.4657	315.1128	480.8080
1987	11.75648	200.6308	366.3261

expenditure tending to appreciate the real exchange rate) on the official real exchange rate. This seems to indicate that if the government had allowed the nominal exchange rate to move freely (depreciate) with the increase in domestic public sector expenditure then Ghanaian exports would have fared better. Table 5.7 shows how the estimated official real exchange rate (RERT1) would have evolved if public sector expenditure had been held at its 1970 level.[72] In all cases where public sector expenditure was higher the actual (official) real exchange rate was lower than the simulated value holding public expenditure constant. We see in fact, that the appreciation of the official exchange rate from 1972 to 1987 would not have occurred if public sector expenditure had remained constant. The empirical results also show that the rising public sector expenditure along with stringent restrictions on foreign exchange transactions did seem to lead to very high black market premia.[73] Table 5.8 gives simulation results for two cases: one in which the terms of trade are kept fixed at their 1974 (high) level (PRESIM2) and the other in which the fiscal deficit is kept at its 1970 level (PRESIM1). In both cases we can see how the premium would have been lower in both cases than it actually was. A glance at Table 5.8 shows us that in 1980 for example, the black market premium (plus one) would have been .54 instead

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[72]I am basing these estimates on equation (e).

[73]These high black market premia were partly responsible for the real exchange rate appreciation.

Table 5.7

obs	RER	RERT1
1972	114.3468	95.66856
1973	96.05199	115.9243
1974	95.35734	87.18728
1975	80.24221	98.03925
1976	53.79918	85.56528
1977	26.38002	73.20646
1978	25.18789	65.30401
1979	28.62447	78.84112
1980	21.76503	85.17524
1981	10.97164	66.48678
1982	9.151826	70.79918
1983	13.35075	31.51451
1984	39.88649	83.88363
1985	54.36500	95.39480
1986	69.53115	77.32159
1987	87.95859	99.37134

Table 5.8

obs	PREM2	PRESIM1	PRESIM2
1970	1.699333	1.164673	0.296011
1971	1.472677	0.957904	0.120170
1972	1.256947	1.616774	0.675312
1973	1.289270	0.799401	0.875752
1974	1.500870	0.296010	1.229355
1975	1.728696	0.520858	2.992483
1976	2.526957	1.207894	4.877636
1977	8.000870	0.178589	6.650724
1978	5.077740	0.235994	5.653349
1979	5.658182	0.538346	4.044519
1980	6.910182	0.543343	6.464724
1981	9.545455	1.984870	6.658423
1982	9.824364	2.564479	7.499870
1983	8.672736	6.060825	6.361796
1984	2.686224	1.834254	0.259934
1985	2.414237	2.100621	0.817008
1986	2.242047	1.718127	0.475674
1987	1.797922	1.844114	0.010098

of 6.9 if public sector expenditure had remained at its 1970 low level.[74] From 1977 to 1983 the public sector deficit seems to be the most important factor affecting the black market premium. Even with a very favorable terms of trade (the 1974 level), the premium would have been high during these years if the fiscal deficit had remained at its actual level.

In summary, our empirical results seem to indicate that high public sector expenditure (or a high fiscal deficit) has contributed to Ghana's external sector problems and that if the government had pursued more moderate fiscal (lower public sector expenditure) and monetary (less money creation and therefore a lower premium) policies, the economy would have done better. In particular, there would have been a more favorable exchange rate, the trade balance would have improved significantly better and there would have been fewer black market activities.

[74]These are based on equation (c).

Definition of Variables used in Regressions, Part V

ERAV=average exchange rate, cedis/dollar

PREM2=average black market premium plus 1

PREMIUM=end-of-period black market premium

RER=real official exchange rate

BMRER=black market real exchange rate

BMER=black market real exchange rate

PSD2=public sector expenditure

TS2=trade surplus

FD2=fiscal deficit

AID=aid flows to Ghana

EXDEP=expected rate of depreciation

TOT=terms of trade

MONEYD=money stock

TILMOMDL=stock of foreign assets
TOT=terms of trade

obs	BMRER	RER	ERAV	BMER	PREM2	PREMIUM
1970	166.2030	97.80481	1.020400	1.734000	1.699333	1.660999
1971	137.7694	93.55030	1.034850	1.524000	1.472677	1.000011
1972	143.7279	114.3468	1.333390	1.676000	1.256947	1.220703
1973	123.8370	96.05199	1.165000	1.502000	1.289270	1.499231
1974	143.1189	95.35734	1.150000	1.726000	1.500870	1.337838
1975	138.7144	80.24221	1.150000	1.988000	1.728696	1.669580
1976	135.9482	53.79918	1.150000	2.906000	2.526957	3.782642
1977	211.0631	26.38002	1.150000	9.201000	8.000870	6.687015
1978	127.8975	25.18789	1.763580	8.955000	5.077740	3.636403
1979	161.9624	28.62447	2.750000	15.56000	5.658182	5.196420
1980	150.4003	21.76503	2.750000	19.00300	6.910182	4.040044
1981	104.7293	10.97164	2.750000	26.25000	9.545455	18.18202
1982	89.91087	9.151826	2.750000	27.01700	9.824364	43.63684
1983	115.7875	13.35075	8.829970	76.58000	8.672736	3.233010
1984	107.1441	39.88649	35.98620	96.66700	2.686224	2.000000
1985	131.2500	54.36500	54.36500	131.2500	2.414237	2.417150
1986	155.8921	69.53115	89.20420	200.0000	2.242047	2.222000
1987	158.1427	87.95859	153.7330	276.4000	1.797922	1.643795

obs	AID	EXDEP	TOT	MONEYD	TILMOND
1970	59.10000	0.000000	139.3300	295.4822	0.553633
1971	56.90000	78.18133	140.3000	307.2716	0.898950
1972	58.50000	-29.59993	124.0000	344.3254	0.757756
1973	41.00000	-10.15703	154.9000	485.7940	0.699068
1974	36.50000	0.000000	174.1000	605.1826	2.114716
1975	125.7000	0.000000	165.1000	923.9479	4.504899
1976	91.50000	0.000000	137.6000	1314.922	5.416380
1977	120.5000	0.000000	178.8000	2236.374	12.90512
1978	151.4000	139.1299	163.5000	2579.798	31.57007
1979	204.3000	0.000000	164.4000	1870.214	31.05077
1980	234.1000	0.000000	164.2000	2461.309	63.75380
1981	187.5000	0.000000	106.5000	3752.884	53.91605
1982	175.8000	0.000000	83.30000	4528.087	105.1277
1983	139.1000	991.0301	81.60000	2121.681	151.0688
1984	241.3000	66.65000	106.3000	842.2896	31.31942
1985	293.7000	19.97600	100.0000	845.1982	25.78973
1986	410.5000	50.04502	112.5000	773.8212	19.68781
1987	419.1000	95.59821	103.2000	595.2808	34.43671

obs	FD2	TS2	PSD2
1970	20.09016	51.90000	452.2736
1971	21.25912	-33.60000	490.4092
1972	74.24684	161.4000	422.9820
1973	117.1674	212.9000	594.8498
1974	183.0435	-29.20000	855.2174
1975	490.8696	150.4000	1269.565
1976	820.0000	88.80000	1737.391
1977	1129.565	29.40000	2434.783
1978	1012.146	112.5000	2201.204
1979	674.5455	262.6000	1688.545
1980	1097.091	195.3000	2357.637
1981	1130.909	-243.6000	3184.727
1982	1277.818	18.30000	3433.818
1983	476.1058	-60.60000	1744.853
1984	40.96015	32.90000	779.0209
1985	119.1943	-36.30000	897.6731
1986	71.85761	60.90000	842.4940
1987	9.141173	-124.7000	712.2127

VI. CONCLUSIONS

Our exploration of the macroeconomic effects of fiscal deficits has made a rather broad sweep of the Ghanaian economy. What are the principal conclusions that we can draw from the study ?

The first conclusion is that the public sector deficit, as measured by the government and the international organizations, underestimates the claim that the public sector has on economic resources. This is not only due to the difficulty of obtaining data, but to the method of measuring the deficit as well. When we consider the financing that the public sector has received from both domestic and external sources, we see that while the government has claimed to reduce fiscal deficits substantially since 1984, in practice these deficits remained larger than advertized.

The Ghanaian government has relied heavily on money creation for financing its deficit. This was not so much a deliberate choice as a default option. Ghana had little or no access to external lending prior to 1984. Domestic financial markets were (and still are) too weak to absorb the high levels of debt that the government might have issued. With shrinking reserves, the only option was to turn to money creation.

Over-reliance on money creation did have an impact on macroeconomic variables. In the seventies the relationship between fiscal deficits and inflation was quite close. Since the early eighties, the relationship between the two has become less

clear cut. High levels of inflation also led to negative interest rates, given the extensive controls in the financial sector, and overvaluation of the official exchange rate.

These high levels of inflation combined with actions on the part of the government that affected private holdings of currency and deposits both had a negative effect on money demand. The negative effect in turn implied reductions in the level of seignorage available to the government. Given the government's dependence on monetary finance the reduction in seignorage implied yet greater levels of money creation thus feeding into further inflation. Government attempts to reduce inflation by demonetization also had the effect of reducing money demand in the longer run and hence, reducing seignorage revenue. These actions are also likely to have seriously weakened the domestic financial system thus making it even more difficult for the government to finance its deficits via borrowing in domestic markets.

The effects of fiscal deficits on consumption are somewhat harder to pin down. The principal conclusion to be drawn from the estimation of the consumption function is that neither the pure Keynesian theory nor the pure Ricardian theory are validated. Our first estimation, incorporating a number of fiscal variables suffered from collinearity and the number of variables is probably too great to provide reliable estimates. Our second estimation, though much simpler, found lagged consumption and disposable income to be significant but did not

find any fiscal variables, interest rates, or private credit to be significant

The results concerning private investment indicate that fiscal deficits did crowd-out private investment and constraints placed on private credit resulted in lower investment than would have otherwise been the case.

Fiscal deficits also had a significant impact on the official real exchange rate, the trade balance and the black market premium. Increased public expenditure worsened the trade balance and lead to appreciation of the real official exchange rate. The empirical results also showed that the rising public sector deficit along with stringent controls of foreign exchange transactions lead to a high black market premium.

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Appendix 1

The system of equations ($\dot{F}$, $\dot{m}$, $\dot{f}$) is linearized around the steady state:

$$\begin{bmatrix} \dot{F} \\ \dot{m} \\ \dot{\phi} \end{bmatrix} = \begin{bmatrix} -\frac{\partial I}{\partial F} & \frac{-\partial I}{\partial m} & \dot{F}_{\phi} \\ 0 & -\hat{e} & 0 \\ \dot{\phi}_F & \dot{\phi}_m & \phi_{\phi} \end{bmatrix} \begin{bmatrix} dF \\ dm \\ d\phi \end{bmatrix}$$

$$-\frac{\partial I}{\partial F} < 0$$

$$-\frac{\partial I}{\partial m} < 0$$

$$\dot{F}_{\phi} = Px \frac{\partial L_1}{\partial \phi} \frac{\partial I}{\partial \phi} \gtrless 0$$

$$\dot{\phi}_F = -\frac{\lambda(1-\lambda)}{\lambda'} \frac{\phi}{F} > 0 \quad \dot{\phi}_m = \frac{(1-\lambda)^2}{\lambda'} < 0, \; \dot{\phi}_{\phi} = \frac{-\lambda(1-\lambda)}{\lambda'} > 0$$

For saddlepath stability, we need the determinant of the above matrix to be greater than zero. The determinant is:

$$-\hat{e} \left[\frac{\partial I}{\partial F} \dot{\phi}_{\phi} - \dot{F}_{\phi} \dot{\phi}_F\right]$$

$$= \hat{e} \frac{\partial I}{\partial F} \dot{\phi}_{\phi} + \dot{F}_{\phi} \dot{\phi}_F \hat{e}$$

A sufficient condition for saddlepath stability is that $\dot{F}_{\phi} > 0$. Intuitively, this implies that an increase in the black market premium must improve the unofficial trade balance. This makes sense since an increase in the premium raises exports in the black market and lowers imports. In other words, we must have:

$$-Px \frac{\partial L_1}{\partial \phi} - \frac{\partial I}{\partial \phi} > 0$$

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